Response Action Contract
For Remedial Response, Enforcement Oversight, and Non-Time-Critical Removal Activities at Sites of Release or Threatened Release of Hazardous Substances in EPA Region VIII

U.S. EPA Contract No. EP-W-05-049

Field Oversight Report
U.S. Moorings Substantial Product Investigation
Gasco Sediments Site, Portland, Oregon

Work Assignment No.:	**336-VOEE-10EW**
	Gasco/Siltronics
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Acronyms and Abbreviations

AOC	Administrative Settlement Agreement and Order on Consent for Removal Action
BLRA	Baseline Risk Assessment
bml	below mudline
BNSF	Burlington Northern Santa Fe
CDM Smith	CDM Federal Programs Corporation
EE/CA	Engineering Evaluation/Cost Estimate
EPA	U.S. Environmental Protection Agency
FCR	Field Change Request
ft	feet
HASP	health and safety plan
LOE	line of evidence
NAPL	non-aqueous phase liquid
PAH	polycyclic aromatic hydrocarbon
PCE	probable effects concentrations
PID	photoionization detector
PPE	personal protective equipment
RAO	removal action objective
RI	Remedial Investigation
RM	river mile
RPM	Remedial Project Manager
Site	Gasco/Siltronic site
SOW	Statement of Work
TZW	transition zone water
USACE	U.S. Army Corps of Engineers
U.S. Moorings	U.S. Government Moorings site

Section 1
Introduction

Under Work Assignment 336-VOEE-10EW from U.S. Environmental Protection Agency (EPA), under EPA Region 8, Remedial Action Contract 2 No. EP-W-05-049, CDM Federal Programs Corporation (CDM Smith) was assigned to conduct oversight of field investigation activities at the U.S. Government Moorings site (U.S. Moorings) offshore area adjacent to the Gasco/Siltronic site (Site) located in Portland, Oregon.

CDM Smith provided technical field oversight of activities conducted by NW Natural in the U.S. Moorings offshore area as described in the *Study Design for Sediment Characterization Adjacent to U.S. Moorings Site Required by EPA – Addendum 1 to the Project Area Identification Report Quality Assurance Project Plan* (Anchor QEA 2013). CDM Smith also observed the processing of sediment cores collected by the U.S. Army Corps of Engineers (USACE) as part of a geotechnical and environmental investigation conducted around the U.S. Moorings dock in preparation for dock replacement. The objective of NW Natural's investigation and the environmental portion of the USACE's investigation was to identify the presence of substantial product as defined in Appendix A of the Gasco Sediments Site September 9, 2009 Administrative Settlement Agreement and Order on Consent for Removal Action (AOC; Docket No. CERCLA 10-2009-0255).

Sediment core sampling was conducted by Anchor QEA, LLC (Anchor QEA) on behalf of NW Natural from September 28 through September 29, 2013, and November 1, 2013. During this work, CDM Smith conducted oversight on the boat collecting the sediment cores to monitor health and safety compliance. CDM Smith also conducted oversight at the onshore processing area located on the Gasco site to provide an independent verification of the sediment characterization.

Sediment core sampling was conducted by Shannon & Wilson, Inc. (Shannon and Wilson) on behalf of USACE from September 29, 2013 through November 1, 2013. CDM Smith observed sediment core processing at the processing area located on the U.S. Moorings site to provide an independent verification of the sediment characterization.

This report summarizes the field oversight activities, field observations, photo documentation, and includes a discussion of deviations from the *Study Design for Sediment Characterization Adjacent to U.S. Moorings Site Required by EPA – Addendum 1 to the Project Area Identification Report Quality Assurance Project Plan.*

1.1 Project Background

The Gasco Sediments Site is located on the southwest bank of the lower Willamette River generally between river miles (RMs) 6 and 7, immediately downstream of the Burlington Northern Santa Fe (BNSF) railroad bridge. The U.S. Moorings offshore area is located downriver and adjacent to the Gasco Site. The Gasco and U.S. Moorings sites are located within Portland Harbor, which was designated a federal Superfund site by EPA in 2000 based on sediment contamination.

The Gasco Sediments Site 2009 AOC Statement of Work (SOW) identifies the process that is to be used to delineate the Gasco Sediment Sites interim project area. Section 3.6.2 of the SOW identifies nine

risk criteria that are to be used to delineate the interim project area. These nine risk criteria or lines of evidence (LOEs) include:

1. Substantial Presence of Product
2. Benthic Toxicity Bioassays
3. Benthic Toxicity Models
4. Human Health Shellfish Consumption
5. Human Health Direct Sediment Exposures
6. Sediment Probable Effects Concentrations (PECs)
7. Portland Harbor "Baseline" Polycyclic Aromatic Hydrocarbon (PAH) Levels
8. Groundwater Plume Concentrations (i.e., Transition Zone Water [TZW])
9. Other Potential LOEs (based on the Portland Harbor Baseline Risk Assessments)

In May 2012, NW Natural submitted a draft Engineering Evaluation/Cost Estimate (EE/CA) (Anchor QEA 2012) for the Gasco Sediments Cleanup Site to EPA for review. Consistent with the AOC, Removal Action Objectives (RAOs) presented in the EE/CA include a preference to remove "sediments containing substantial amounts of product that may serve as potential future source of risk material, unless it can be shown that the costs of such removal are clearly disproportionate to the degree of risk reduction to be attained through physical removal as compared to other remedial options for the same material." Section 2.5.3 of the EE/CA provides a summary of substantial product observations within the Gasco Sediments Site Area of Interest. The Gasco Sediments Site Area of Interest contains a portion of the U.S. Moorings offshore area including the U.S. Moorings dock. No substantial product was identified in the U.S. Moorings offshore area by NW Natural in the draft EE/CA.

The USACE was provided a copy of the draft EE/CA for review. The USACE submitted a letter dated August 14, 2012, to EPA (USACE 2012) in which USACE presented their own evaluation of substantial product in the U.S. Moorings offshore area using core data collected during the U.S. Moorings 2008 Remedial Investigation (RI) and 2008/2009 supplemental investigation and challenged the draft EE/CA conclusions. USACE identified nine core locations they believed met the definition of substantial product as defined in the Gasco 2009 AOC SOW.

Due to the critical nature of the substantial product LOE in defining the Gasco Sediments Site Project Area and evaluating removal action alternatives in the EE/CA, EPA directed their contractor, CDM Smith, to review core logs for sediment cores collected within the U.S. Moorings offshore area to determine whether substantial product was present consistent with the definition provided in Section 3.6.2.1 of the Gasco 2009 AOC SOW. A total of 24 core logs were reviewed to evaluate the presence of substantial product in the U.S. Moorings offshore area using the sediment descriptions provided on the logs.

Based on CDM Smith's review of the logs, three core locations were identified as potentially containing substantial product based on the sediment descriptions contained within the logs. Two other locations were identified as potentially containing substantial product based on the depth to which future maintenance dredging outside the navigation channel is anticipated to occur. The following

core locations were identified as potentially containing substantial product as a result of the review of the U.S. Moorings core logs:

- 50-BG
- GS-01
- SDDA-18
- 20-BF
- C528

EPA provided the evaluation to NW Natural (EPA 2012) and indicated that NW Natural could either accept the substantial product findings of the evaluation or re-sample the five identified sediment locations to verify the presence of substantial product. During a January 29, 2013 meeting between EPA, NW Natural, and Siltronic Corporation, NW Natural indicated they planned to pursue re-investigation of the five core locations.

1.2 Substantial Product Definition

RAOs presented in Section 3.2 of the Gasco 2009 AOC SOW requires "removal of sediments containing substantial amounts of product (e.g., solid "tar" and/or NAPL [non-aqueous phase liquid]) that may serve as potential future source of risk material, unless it can be shown that the costs of such removal are clearly disproportionate to the degree of risk reduction to be attained through physical removal as compared to other remedial options for the same material."

The working definition of substantial product is provided in Section 3.6.2.1 of the Gasco 2009 AOC SOW. Direct text taken from the SOW regarding the definition of substantial product is provided below for reference:

> ***3.6.2.1 Substantial Presence of Product***
> *Areas with substantial presence of product in sediments is a line of evidence related to potential mobility of chemicals in the future, and thus related to risks identified in the BLRA [Draft Baseline Risk Assessment]. Visual observations in sediment cores shall be the primary parameter used for this line of evidence. As noted above, the term "substantial" product is intended to 1) target product that is related to potential future mobility and 2) indicate a preference for removal as defined by RAO #1. The definition of substantial product does not include every incidence of product observation at the site. Based on core observations, the working definition of "substantial presence of product" is those sediments that meet the following criteria:*
>
> 1. *Bands of product, layers of product, "saturated" sediments, "stained" sediments, and/or seams of product that are greater than 2 inches thick.*
> 2. *Any layer or seam of product, regardless of thickness, that is clearly defined as liquid NAPL that is also mobile (i.e., "oozes" or "drips" out of the core during core observations).*
>
> *Modifying factors to this definition are:*
>
> 3. *If top 5 ft of core has no substantial product under Criteria #1, then deeper product should be judged as "not substantial", even if relatively thick layers of product exist at greater depths.*

4. *If there are any seams of mobile liquid NAPL (not solid or semisolid tar) per Criteria #2 then this is substantial product regardless of depth and the characteristics of overlying sediments.*

The following is NOT substantial product:

- *Any layers of non-mobile product (i.e., bands, layers, saturated sediments, stained sediments) that are less than 2 inches thick.*
- *Petroleum odors that are not associated with visual evidence of product beyond sheens and blebs.*
- *Sheens that are not associated with more substantial visuals of product.*
- *Isolated product blebs or spots not associated with more substantial visuals of product.*

Criteria #3 shall consider whether the 5 feet of overlying relatively clean material includes any sediment that would be expected to be removed as part of Army Corps maintenance dredging in the navigation channel. If so, the 5 ft depth requirement should be judged from the depth to which maintenance dredging would occur. The edges of the area with "substantial presence of product" shall be defined by cores which do not contain substantial product.

1.3 Investigation Summary

1.3.1 NW Natural U.S. Moorings Substantial Product Investigation

A *Study Design for Sediment Characterization Adjacent to U.S. Moorings Site Required by EPA – Addendum 1 to the Project Area Identification Report Quality Assurance Project Plan* was prepared by Anchor QEA (2013) on behalf of NW Natural to provide a work plan for the additional investigation in the U.S. Moorings offshore area. The objective of this investigation was to substantiate the presence of substantial product at the five core locations identified in EPA's November 2012 evaluation, as well as collect and archive sediment samples from select intervals for potential future chemical analyses.

CDM Smith personnel were present during the sediment core sampling and processing on behalf of EPA to provide oversight of health and safety and the technical aspects of the substantial product investigation.

A total of five sediment cores were collected by Anchor QEA on behalf of NW Natural from the five EPA-identified sediment core locations. Sediment core sample locations are shown on **Figure 1**. The cores were visually inspected for the presence of substantial product, and sediment from select intervals was archived for potential future chemical analyses. The five sediment cores were designated:

- 50-BG-AQ
- GS-01-AQ
- SDDA-18-AQ
- 20-BF-AQ
- C528-AQ

1.3.2 USACE U.S. Moorings Substantial Product Investigation

USACE notified EPA in August 2013 of their intent to conduct a geotechnical and environmental investigation around the existing U.S. Moorings dock in anticipation of demolishing the existing dock and constructing a new dock. USACE indicated they planned to collect eight environmental sediment cores for the express purpose of visually observing the cores for substantial product.

CDM Smith personnel were present on behalf of EPA during the processing of the environmental sediment cores to observe activities and visually inspect the cores to provide an independent verification of the presence of substantial product.

A total of eight sediment cores were collected by Shannon & Wilson on behalf of USACE at locations around the perimeter of the existing dock and footprint of proposed new dock. Sediment core sample locations are shown on **Figure 2**. The cores were visually inspected for the presence of substantial product. The eight sediment cores were designated:

- SD-101
- SD-102
- SD-103
- SD-104
- SD-106
- SD-107
- SD-108
- SD-109

Section 2
Objectives and Scope of Field Oversight

2.1 Governing Documents

Investigation activities completed by NW Natural at the U.S. Moorings site were conducted in accordance with the following documents:

- Anchor QEA, LLC. 2013. Memorandum from Mr. Ryan Barth and Ms. Joy Dunay to Mr. Sean Sheldrake, U.S. Environmental Protection Agency, re: Study Design for Sediment Characterization Adjacent to U.S. Moorings Site Required by EPA – Addendum 1 to the Project Area Identification Report Quality Assurance Project Plan. July 18, 2013.

- Anchor QEA, LLC. 2010. *Data Gaps QAPP/FSP (Appendix A to the Project Area Identification Report), Gasco Sediments Cleanup Action.* Prepared for NW Natural. July 2010.

- U.S. Environmental Protection Agency. 2013a. Letter from Mr. Sean Sheldrake to Mr. Bob Wyatt, NW Natural, and Mr. Myron Burr, Siltronic Corporation, re: Review of Study Design for Sediment Characterization Adjacent to U.S. Moorings Site, Addendum 1 to the Project Area Identification Report Quality Assurance Project Plan, Gasco Sediments Site. August 15, 2013.

  This letter provided EPA's conditional approval of Anchor QEA's July 18, 2013 Study Design Memorandum for the U.S. Moorings investigation, which included some scope of work modifications.

- U.S. Environmental Protection Agency. 2013b. Letter from Mr. Sean Sheldrake to Mr. Bob Wyatt, NW Natural, and Mr. Myron Burr, Siltronic Corporation, re: EPA's Response to NW Natural's Response to EPA's Review of Study Design for Sediment Characterization Adjacent to U.S. Moorings Site, Addendum 1 to the Project Area Identification Report Quality Assurance Project Plan, Gasco Sediments Site. September 9, 2013.

  This letter provided additional clarification on the conditional approval granted by EPA in EPA's August 15, 2013 letter for the July 18, 2013 Study Design Memorandum.

Investigation activities completed by USACE at the U.S. Moorings site were conducted in accordance with the following document:

- Shannon & Wilson, Inc. 2013. *Sediment Investigation Work Plan, Geotechnical and Sediment Investigation, U.S. Government Moorings, Portland, Oregon.* Prepared for U.S. Army Corps of Engineers, Seattle District. October 11, 2013.

2.2 Objectives of Field Oversight

The main objectives of the field oversight were to 1) observe NW Natural field activities for compliance with the governing documents listed in Section 2.1, and 2) provide an independent verification of the presence of substantial product in sediment cores collected by NW Natural and USACE. All sediment cores collected from the U.S. Moorings offshore area during NW Natural's and

USACE's investigations were visually inspected by a representative from EPA, NW Natural, and USACE. CDM Smith's presence, as a representative of EPA, provided an independent evaluation from the assessments made by NW Natural and USACE.

Through daily reporting of field observations made by CDM Smith, the EPA Remedial Project Manager (RPM) was informed of the detailed status of the substantial product investigation work. Furthermore, oversight personnel provided the RPM with timely notification of issues that developed during the course of the investigation work, including possible deviations from the governing documents. This information was important because it assisted the RPM in making decisions regarding any necessary changes in the data collection effort.

2.3 Field Investigation Schedule

Sediment core sampling and processing was conducted by Anchor QEA on behalf of NW Natural from September 28 through September 29, 2013, and on November 1, 2013. Sediment core sampling and processing was conducted by Shannon & Wilson on behalf of USACE from September 29, 2013 through November 1, 2013. Both Anchor QEA (NW Natural) and Shannon & Wilson (USACE) utilized the same sediment coring subcontractor, Marine Sampling Services, for their respective investigations such that NW Natural's cores were collected first followed by USACE's cores.

2.4 Oversight Personnel

Oversight was conducted by the following CDM Smith personnel:

- Lance Peterson, Project Manager/field team support
- Jeanette Mullin, Field Team Lead – sediment core processing
- Shawn Oliveira, Health and Safety Lead – sediment core sampling/processing

2.5 Field Documentation

Information and notations were recorded as required in a field logbook in accordance with CDM Smith Technical Standard Operating Procedure 4-1, Revision 7 Field Logbook Content and Control. Field documentation consisted of an accounting of activities that occurred during the U.S. Moorings substantial product investigations, noting any problems or deviations from governing documents described in Section 2.1.

The field team lead maintained the field logbook and submitted it to the CDM Smith Project Manager for review, used it for preparing field reports, and filed it in the project files. Field notes are provided in **Appendix A**.

2.6 Photographic Documentation

Photographs were taken during field oversight in accordance with CDM Smith Technical Standard Operating Procedure 4-2, Revision 8 Photographic Documentation of Field Activities. Photo-documentation by the CDM Smith field oversight team included taking photos of field activities (especially where visual contamination was noted), field quality assurance/quality control

procedures, health and safety compliance procedures, and any other activities determined necessary. Photographs taken during field oversight are provided by date in **Appendix B**.

Section 3
Observations

3.1 Summary of Work Performed

On October 24, 2013, before mobilizing to the Gasco Sediments Site, a field-planning meeting was conducted by the CDM Smith Project Manager and attended by the CDM Smith field staff. During the meeting, CDM Smith field staff were provided information about the Site, health and safety issues, the objectives and scope of field activities, governing documents for the field work and required quality control measures, the roles and responsibilities of staff involved, equipment and training needs, communication requirements, and schedule. CDM Smith field staff obtained the required field supplies, including personal protective equipment (PPE), and reviewed health and safety plans (HASPs) to determine health and safety protocols for performing site work. The daily descriptions provided below present a general overview of activities performed during the substantial product investigation fieldwork with a focus on health and safety compliance, compliance with sampling and processing protocols, notation of field evidence of contamination (sheen, odors, elevated photoionization detector [PID] readings, discoloration) observed in the sediment cores, and whether the evidence of contamination met the criteria for substantial product.

3.1.1 NW Natural Sediment Core Collection and Processing

Sediment core collection and processing work initially occurred over a two-day period from October 28 through 29, 2013. However, a sediment core could not be collected at the planned GS-01 location by the core collection boat as the river water level was too low. NW Natural's consultant returned to the GS-01 location on Friday, November 1, 2013, during an extremely low tide when the location was dry to collect a sediment core using manual methods.

The following field teams were onsite to conduct and/or observe NW Natural's substantial product investigation in the U.S. Moorings offshore area:

- Anchor QEA – Northwest Natural's consultant
- Marine Sampling Services – Boat operation and sampling
- CDM Smith – Field oversight on behalf of EPA
- USACE – Observe core processing
- Shannon & Wilson – USACE's consultant/observe core processing

CDM Smith's field team monitored the offshore core collection and onshore core processing conducted on October 28 through 29, 2013, and on November 1, 2013, to provide oversight of these efforts. Following is a summary of CDM Smith's observations.

October 28, 2013

In the early afternoon on October 28, 2013, the Anchor QEA sediment processing core crew conducted a kick-off meeting to discuss the scope of sediment core processing and logging, sample collection for archiving purposes, and health and safety issues – including exclusion zone protocols, potential trip

hazards, and hazards associated with saw cutting to open aluminum core barrels (noise hazard and flying debris). In addition to Anchor QEA and CDM Smith staff, the following USACE representatives were present at the sediment core processing area. A representative of USACE's consultant, Shannon & Wilson, was also present to observe core processing operations.

Four cores were collected on October 28, 2013 from the U.S. Moorings offshore area: 50-BG-AQ, SDDA-18-AQ, 20-BF-AQ, and C528-AQ (**Figure 1**). A sediment core was not able to be collected by the core collection boat at the GS-01 location due to low water conditions near the shore where the core location was situated. Anchor QEA notified EPA regarding the GS-01 core location situation.

Cores SDDA-18-AQ and C528-AQ were processed on October 28th at a core processing station set up adjacent to the Anchor QEA field trailer on the Gasco uplands. Core SDDA-18-AQ was processed starting at 1:00 pm, and Core C528-AQ was processed starting at 3:00 pm. Anchor archived sediment from each core from the following intervals: 0-1 feet, 1-4 feet, 4-8 feet, and 8-12 feet. Following are observations of field evidence of contamination observed within SDDA-18-AQ and C528-AQ and findings with respect to the presence of substantial product.

SDDA-18-AQ — No substantial product identified.
Recovery: 89% from 0 to 12.3 feet below mudline (ft bml).

Field Evidence of Contamination Observed in Core:
(noted field evidence does not meet definition of substantial product)

3.7 ft bml:	Black band, 1-inch thick
4.5 – 4.7 ft bml:	Black band that appeared to be approximately 2-inches thick. Further investigation revealed the band to be separated into two bands by a very thin sediment layer. No sheen observed within band. A slight hydrocarbon odor noted in this interval. Organics such as wood fragments and roots were present in the black band.

Anchor QEA collected a sample from the band(s) at 4.5 to 4.7 ft bml to archive for potential future laboratory analysis.

C528-AQ — No substantial product identified.
Recovery: 75% from 0 to 9.3 ft bml.

Field Evidence of Contamination Observed in Core:
(noted field evidence does not meet definition of substantial product)

5.8 ft bml:	Black band, 1-inch thick, no sheen observed, slight hydrocarbon odor
7.8 ft bml:	Thin, discontinuous black seam (appears pebbly) less than 1 inch in thickness with no odor

October 29, 2013

At 8:35 am, the sediment core processing crew conducted a health and safety briefing prior to the start of core processing. USACE representatives were present at the site in addition to Anchor QEA and CDM Smith staff.

Cores 20-BF-AQ and 50-BG-AQ were processed on October 29th at the core processing station located on the Gasco uplands. The cores had been collected on October 28th and were kept chilled overnight. Core 20-BF-AQ was processed starting at 9:00 am, and Core 50-BG-AQ was processed starting at 10:30

am. Anchor QEA archived sediment from each core from the following intervals: 0-1 feet, 1-4 feet, 4-8 feet, 8-12 feet, and 12 feet to the core end depth. Following are observations of field evidence of contamination observed within 20-BF-AQ and 50-BG-AQ and findings with respect to the presence of substantial product.

20-BF-AQ — No substantial product identified.
Recovery: 94% from 0 to 13.1 ft bml.

Field Evidence of Contamination Observed in Core:
(noted field evidence does not meet definition of substantial product)

10.12 - 10.2 ft bml:	Thin black band approximately 1 inch thick, no odor, no sheen
10.89 – 10.95 ft bml:	Thin black band less than 1 inch thick, no odor, no sheen
11.7 – 11.8 ft bml:	Thin black band approximately 1 inch thick, hydrocarbon odor, no sheen

The 50-BG-AQ core location is situated on the upriver side of the U.S. Moorings dock adjacent to the Gasco uplands. This area of the river is not scheduled for maintenance dredging, unlike the SDDA-18-AQ, C528-AQ, and 20-BF-AQ core locations. As a result, the substantial product definition, as it relates to "bands of product' versus NAPL, indicates any 2-inch thick (or greater) product band observed within the sediment core must be located within the upper 5 feet to meet the substantial product definition. Any 2-inch thick product band observed below the upper 5 feet of sediment does not meet the substantial product definition. Product bands greater than 2-inches thick were observed in the 50-BG-AQ sediment core but all bands were located below the 5-foot threshold. The field evidence of contamination observed in 50-BG-AQ is noted below.

50-BG-AQ — No substantial product identified.
Recovery: 99% from 0 to 13.9 ft bml.

Field Evidence of Contamination Observed in Core:
(noted field evidence does not meet definition of substantial product)

5.7 – 5.95 ft bml:	Dark black band approximately 3 inches thick, strong hydrocarbon odor
7.7 – 7.95 ft bml:	Dark black band approximately 3 inches thick, strong hydrocarbon odor, slight sheen
8.25 – 8.4 ft bml:	Wood waste layer containing visible sheen, hydrocarbon odor
8.85 – 9.05 ft bml:	Dark black band approximately 2.4 inches thick, hydrocarbon odor
10.15 – 10.35 ft bml:	Dark black band approximately 2.4 inches thick, hydrocarbon odor, slight sheen
12.9 – 13.05 ft bml:	Black band approximately 1 inch thick
13.55 – 13.61 ft bml:	Black band less than 1 inch thick

November 1, 2013

On October 31, 2013, Anchor QEA submitted a Field Change Request (FCR) Form to EPA to modify the collection method for the sediment core planned for the GS-01 location. The river water level had been too low on October 28, 2013 for the core collection boat to access the GS-01 location as originally planned. Anchor QEA proposed collecting a sediment core at this location using a hand-driven coring device during an extremely low tide to occur around 10:30 am to noon on November 1, 2013, in which it was anticipated the GS-01 location would be dry (i.e., above the water line). EPA approved the FCR.

The GS-01 location was observed to be dry at around 10:30 am on November 1, 2013. At 10:35 am, the core collection crew, CDM Smith, and representatives from USACE arrived at the GS-01 location. The former 2006 GS-01 core location had been marked by Anchor QEA previously for surveying purposes and the marker was still present (tubing and a water bottle anchored at the former boring location).

The core collection crew used a hand-driven coring device to attempt to collect a core near the GS-01 location. The target was the upper 2 feet of sediment as the original 2006 GS-01 log indicated "black staining 0 to 2.0 feet." The core collection crew intended to drive the core tube to a depth of 3 feet and then extract the tube containing the sediment core. The core collection crew made three separate attempts to collect a sediment core at the GS-01 location but they experienced difficulties due to large cobbles in the subsurface that deflected and deformed the polycarbonate core tube and difficulties associated with removing the tubes from the subsurface without losing the sediment core contained within as it was pulled up from the subsurface.

During the first coring attempt, the core collection crew removed approximately five inches of cobbles by hand from the surface of a small area near the GS-01 marker and then drove a 4-foot long polycarbonate core tube 3.5 ft into the subsurface. Prior to retrieval of the first core, the core collection crew attempted to collect a second core at a slightly different location. Another 4-foot long polycarbonate core tube was driven approximately one foot into the subsurface when refusal was encountered. Approximately 10 inches of sediment was measured within the second core tube. However, this material was lost during extraction and the end of the tube was damaged by an impact with a rock in the subsurface.

A third attempt was then made to collect a sediment core. The core collection crew removed some of the large cobbles (i.e., rip rap) on the surface and removed approximately six inches of reddish course-grained sand and rocks until the gray sediment beneath was uncovered. The core tube was driven three feet into the subsurface during the third attempt. Approximately 1.5 feet of material was measured in the core tube prior to removal. The core collection crew attempted to remove the core tube by excavating around it using a shovel. A dark gray silty sand was observed in the sidewall of the excavation. No black staining was observed along the sidewall, which reached a maximum depth of 2.5 ft bml. A slight sheen was observed on the surface of the water within the hole but no odor was noted. The core collection crew was unable to dig deeper due to sloughing and influx of water. The sediment contained within the core tube was lost during extraction, and the base of the tube was deformed by a rock impact and was not able to be re-used for another attempt.

Ultimately, the first core attempt was the only one in which sediment was able to be recovered. The core collection crew used a shovel to excavate around this core tube in order to remove it from the subsurface. Close observations were made of the excavation sidewalls around this core tube as it became clear that excavating to depth may be the only way to observe the upper 2 feet of interest based on the lack of recovery experienced with the second and third attempt core tubes (note: the second and third attempt core tubes were removed from the subsurface prior to removal of the core tube driven in the first attempt).

The excavation around the first attempt core reached a maximum measured depth of 2 feet 7 inches bml (which includes the 5 inches of cobbles removed prior to advancing the core tube) before the sidewalls began to slough due to the influx of water. No black staining was observed along the sidewalls and no odor was noted. A sheen was observed on the surface of the water within the hole. Some black mottling was observed in some of the sediment removed from the excavation, but these

were few and sporadic, and no odor was noted from these black pockets. The black coloring appeared to be related to organics.

The core tube was able to be removed from the subsurface and approximately 1.6 feet of sediment was recovered from the first attempt core. The core tube was transported to a core processing station set up adjacent to the Anchor QEA field trailer on the Gasco uplands. Sediment removed from the excavation around the core tube was placed on aluminum foil and then set into a bucket for transport to the core processing area for further inspection along with the sediment core.

Observations from the first core and the excavation around the first core were used to make decisions regarding the presence or lack thereof of substantial product at the GS-01 location. Observations are summarized below:

GS-01-AQ
No substantial product identified.
Sediment Core Recovery: 1.6 feet
Maximum Excavation Sidewall Depth Observed: 2.6 ft bml

Field Evidence of Contamination Observed in Core or Sidewall:
No field evidence of substantial product observed. No black bands or layers observed. No odors noted in core or excavation. Slight sheen observed on water in excavation hole.

3.1.2 USACE Sediment Core Processing

Sediment core collection occurred over a two-day period from October 29 through 30, 2013, and sediment core processing work occurred over a three-day period from October 30, 2013 through November 1, 2013. The following field teams were onsite to conduct and/or observe USACE's substantial product investigation in the U.S. Moorings offshore area:

- Shannon & Wilson – USACE's consultant
- Marine Sampling Services – Boat operation and sampling
- EHS Inc. – Shannon & Wilson's subcontractor/provide health and safety air monitoring
- CDM Smith – Observe core processing on behalf of EPA
- USACE – Observe core processing
- Anchor QEA –Observe core processing on behalf of NW Natural

CDM Smith's field team observed the onshore core processing conducted October 30 through November 1, 2013. USACE provided permission for CDM Smith to photo-document the sediment cores collected through their investigation during observations. Following is a summary of the CDM Smith field team's observations.

October 30, 2013

In the early morning on October 30, 2013, a health and safety briefing was presented by the U.S. Moorings facility Health and Safety Officer to discuss health and safety issues associated with the overall site. A project-specific health and safety briefing was conducted later adjacent to the core processing area by Shannon & Wilson. The core processing area was set up in a garage within a building on the U.S. Moorings upland area.

USACE informed the other field team representatives that five cores had been collected on Tuesday, October 29, 2013: SD-101, SD-102, SD-103, SD-106, and SD-109 (SD-109 was collected in lieu of core SD-105, as this location was inaccessible to the core collection boat due to low water conditions). Location SD-105 was located near the GS-01 position that Anchor QEA had been unable to reach on Monday, October 28, 2013 during their coring collection effort. Core SD-109 is reportedly located central to the inner dock area of the U.S. Moorings dock. Approximate sediment core sample locations are shown on **Figure 2**. USACE collected 14-foot cores at each of these locations.

Cores SD-101, SD-102, and SD-106 were processed on October 30th at the core processing station located within one of the U.S. Moorings buildings. Core SD-101 was processed starting at 9:40 am, Core SD-102 was processed starting at 1:05 pm, and Core SD-106 was processed starting at 3:10 pm. Following are observations of field evidence of contamination observed within SD-101, SD-102, and SD-106, and findings with respect to the presence of substantial product.

SD-101 No substantial product identified.
Recovery: 80% from 0 to 11.1 ft bml.

Field Evidence of Contamination Observed in Core:
(noted field evidence does not meet definition of substantial product)

9.05 – 9.4 ft blm:	Black layer/band approximately 4 inches thick. Hydrocarbon/creosote-type odor. No sheen visible in core, no sheen generated during sheen test (i.e., place aliquot of soil in bowl of water). Woody debris noted in this layer. Shannon & Wilson logged the odor as hydrogen sulfide and faint wood preservative.

Besides the black color and the odor (that field staff did not readily identify as product), no other evidence of product saturation was identified in the 9.05 to 9.4 ft bml layer in SD-101. The odor in woody debris present in the shoe of the core (at 11.1 ft bml) was much stronger and creosote-like, and was similar to the odor in the 9.05 to 9.4-foot interval black layer.

SD-102 No substantial product identified.
Recovery: 90% from 0 to 12.6 ft bml.

Field Evidence of Contamination Observed in Core:
(noted field evidence does not meet definition of substantial product)

2.65 ft bml:	Dark black thin band approximately 1/4 inch thick
7.1 – 7.4 ft bml:	Black banding that is mottled and not continuous, wood fragments noted throughout
7.8 – 8 ft bml:	Slight dark banding/interbedded thin layers
8.2 – 8.8 ft bml:	Layers of black mottling with wood fragments
9.2 – 10.25 ft bml:	Black mottling with numerous wood fragments, hydrogen sulfide odor
10.4 – 12.1 ft bml	Black mottling with wood fragments, hydrogen sulfide/creosote odor

The SD-106 core location is situated on the upriver side of the U.S. Moorings dock adjacent to the Gasco uplands. This area of the river is not scheduled for maintenance dredging. As a result, the substantial product definition, as it relates to "bands of product' versus NAPL, indicates any 2-inch thick (or greater) product band observed within the sediment core must be located within the upper 5

feet to meet the substantial product definition. Any 2-inch thick product band observed below the upper 5 feet of sediment does not meet the substantial product definition. Product bands greater than 2-inches thick were observed in the SD-106 sediment core but all bands were located below the 5-foot threshold. The field evidence of contamination observed in SD-106 is noted below.

SD-106 No substantial product identified.
Recovery: 100% from 0 to 14.1 ft bml.

Field Evidence of Contamination Observed in Core:
(noted field evidence does not meet definition of substantial product)

5.0 - 5.2 ft bml:	Black band approximately 2.4 inches thick, hydrocarbon odor, sheen, wood fragments
9.0 – 9.25 ft bml:	Black band approximately 3 inches thick, sheen
13.1 – 13.35 ft bml:	Black band approximately 3 inches thick, slight hydrocarbon odor

No substantial product was identified by CDM Smith in this core. Upon initial inspection, a dark black layer approximately 3-inches thick was observed from approximately 4.55 to 4.8 feet bml. CDM Smith's more detailed inspection of this layer identified a solid band from 4.58 to 4.71 ft bml (approximately 1.5 inches thick) but outside of these limits there were fine layers of dark brown sediment separating the "larger" layer into separate bands. The layer from 4.58 to 4.71 ft bml contained a hydrocarbon odor and sheen but was less than 2 inches thick.

October 31, 2013

In the early morning on October 31, 2013, Shannon & Wilson conducted a project-specific health and safety briefing adjacent to the core processing area. USACE informed the other field team representatives that three cores had been collected on Wednesday, October 30, 2013: SD-104, SD-107, and SD-108. USACE collected 14-foot cores at SD-104 and SD-107, and a 20-foot core at SD-108.

Cores SD-103, SD-109, SD-107, and SD-104 were processed on October 31st at the core processing station located within one of the U.S. Moorings buildings. Core SD-103 was processed starting at 8:15 am, Core SD-109 was processed starting at 9:40 am, Core SD-107 was processed starting at 11:55 am, and Core SD-104 was processed starting at 2:25 pm. Following are observations of field evidence of contamination observed within SD-103, SD-109, SD-107, and SD-104, and findings with respect to the presence of substantial product.

SD-103 No substantial product identified.
Recovery: 98% from 0 to 13.7 ft bml.

Field Evidence of Contamination Observed in Core:
(noted field evidence does not meet definition of substantial product)

13.1 to 13.3 ft bml:	Black band approximately 2.4 inches thick, hydrocarbon odor but no sheen observed, no sheen produced from sheen test. Layer did not appear to be saturated with product.

SD-109 No substantial product identified.
Recovery: 99% from 0 to 13.9 ft bml.

Field Evidence of Contamination Observed in Core:
(noted field evidence does not meet definition of substantial product)

8.9 – 9.05 ft bml: Black band approximately 1.9 to 2 inches thick, hydrocarbon odor, no sheen, broken sheen (tiny specks) produced from a sheen test

While the layer from 8.9 to 9.05 ft bml appeared saturated/ stained, no sheen was visible in the sediment layer and the hydrocarbon odor was not very strong. A broken sheen (tiny specks) was produced with a sheen test. No blobs or product were visible. The layer appeared to be exactly 2-inches and therefore did not meet the "greater than 2 inches thick" substantial product criteria even if maintenance dredging were to occur in this area such that the layer is within the upper 5 feet of the new dredge surface.

SD-107 No substantial product identified.
Recovery: 75% from 0 to 10.5 ft bml.

Field Evidence of Contamination Observed in Core:
(noted field evidence does not meet definition of substantial product)

5.4 – 5.44 ft bml: Dark black thin band approximately 0.5 inch thick, slight hydrocarbon odor, with organic debris

7.7 – 7.83 ft bml: Black band approximately 1.5 inches thick, slight hydrocarbon odor, no sheen, no sheen produced with sheen test

8.32 – 8.4 ft bml: Black band approximately 1 inch thick, hydrocarbon odor, no sheen, not continuous through core, sheen specks observed during sheen test

8.6 – 8.75 ft bml: Black band approximately 1.8 inches thick, wood material present, slight creosote-like odor, cobble embedded in this interval

9.0 – 9.1 ft bml: Black, medium-grained sand layer approximately 1 inch thick containing wood fragments, visible sheen, creosote and hydrocarbon-like odors, silt observed on one side of core tube so layer is not continuous, broken sheen (sheen specks) produced with sheen test but only on the sand and not the silt

9.36 – 9.42 ft bml: Black layer approximately 0.7 inch thick with sheen

USACE indicated Core SD-107 was re-located from its original planned position because Marine Sampling Services hit refusal during several attempts to collect the core at the proposed location. The position was moved approximately 5 feet further offshore (**Figure 2**).

SD-104 No substantial product identified.
Recovery: 86% from 0 to 11.98 ft bml.

Field Evidence of Contamination Observed in Core:
(noted field evidence does not meet definition of substantial product)

1.25 – 1.28 ft bml: Dark black band approximately 0.4 inch thick, slight hydrocarbon odor, no sheen, no sheen produced with sheen test

1.65 – 1.7 ft bml: Dark black band approximately 0.5 inch thick, band thins through core, slight hydrocarbon odor, no sheen, no sheen produced with sheen test

2.13 – 2.23 ft bml: Dark black band approximately 0.1 inch thick, slight hydrocarbon odor, no sheen, broken sheen (few specks) produced with sheen test

November 1, 2013

In the early morning on November 1, 2013, Shannon & Wilson conducted a project-specific health and safety briefing adjacent to the core processing area. The last core collected by USACE, Core SD-108, was processed on November 1st at the core processing station located within one of the U.S. Moorings buildings. Core SD-108 was processed starting at 9:00 am. Following are observations of field evidence of contamination observed within SD-108 and findings with respect to the presence of substantial product.

SD-108 No substantial product identified.
Recovery: 72% from 0 to 14.3 ft bml.

Field Evidence of Contamination Observed in Core:
(noted field evidence does not meet definition of substantial product)

2.54 – 2.59 ft bml: Thin black band less than 0.5 inch thick, slight hydrocarbon odor, no sheen, broken sheen (few specks) produced with sheen test

3.13 – 3.15 ft bml: Thin black band less than 0.5 inch thick, very faint hydrocarbon odor, no sheen

6.1 – 6.15 ft bml: Black band approximately 0.5 inch thick, no odor, no sheen, no sheen produced with sheen test

7.23 – 7.33 ft bml: Black band approximately 1 inch thick, slight hydrocarbon odor, no sheen, broken sheen (few specks) produced with sheen test

3.1.3 Sediment Core Summary

Table 3-1 summarizes sample core recovery percentages, recovered lengths, and determination of the presence of substantial product for all sediment cores collected during NW Natural's and USACE's U.S. Moorings substantial product investigations.

Table 3-1. Sediment Core Details

Sediment Core Processing Details				
Sediment Core	**Collected By**	**Percent Recovery**	**Total Length of Core to Process (feet)**	**Intervals that Appear to Meet Substantial Product Criteria**
SDDA-18-AQ	Anchor QEA	89%	12.3	None
C528-AQ	Anchor QEA	75%	9.4	None
20-BF-AQ	Anchor QEA	94%	13.1	None
50-BG-AQ	Anchor QEA	99%	13.9	None
GS-01-AQ	Anchor QEA	53%	1.6	None
SD-101	USACE	80%	11.1	None
SD-102	USACE	90%	12.6	None
SD-106	USACE	100%	14.1	None
SD-103	USACE	98%	13.7	None
SD-109	USACE	99%	13.9	None
SD-107	USACE	75%	10.5	None
SD-104	USACE	86%	11.98	None
SD-108	USACE	72%	14.3	None

3.2 Health and Safety Program

Oversight of health and safety during implementation of the substantial product investigation by NW Natural in the U.S. Moorings offshore area was carried out by a CDM Smith employee who is a Certified Industrial Hygienist and Certified Safety Professional. Additional health and safety observations were made by CDM Smith field staff conducting oversight/observations during NW Natural's and USACE's investigations. This section provides a summary of health and safety observations.

During comprehensive health and safety assessments conducted by CDM Smith's Health and Safety Lead on October 28, 2013, field operations for the NW Natural substantial product investigation had some issues that were identified. After the issues were addressed, the work activities were found to be in compliance with the requirements as defined in the project HASPs and Federal Occupational Safety and Health Administration standards (see **Appendix C**).

3.2.1 Health and Safety Meetings

A detailed health and safety meeting was held at the Gasco site on October 28, 2013, before the start of NW Natural's investigation fieldwork (sediment core collection and processing). Anchor QEA held a second activity-specific health and safety meeting in the early afternoon of October 28, 2013 prior to the start of core processing at the core processing station situated on the Gasco uplands. Anchor QEA lead a health and safety briefing each morning prior to the start of fieldwork activities.

The U.S. Moorings facility Health and Safety Officer led a detailed general health and safety briefing on the morning of October 30, 2013 to discuss health and safety related to operating on the U.S. Moorings property. A detailed project-specific health and safety briefing was led by Shannon & Wilson on October 30, 2013 at the core processing station set up within a garage in one of the U.S. Moorings buildings. Shannon & Wilson led health and safety briefings each morning prior to the start of core processing activities.

3.2.2 Use of Personal Protective Equipment

In accordance with the Anchor QEA HASP, proper PPE for the NW Natural investigation fieldwork was modified Level D, requiring Tyvek (or rain gear made of heavy material with long sleeves and long pants), hard hat, safety glasses, nitrile gloves and heavy work gloves (when handling heavy drilling equipment), steel-toed boots, and hearing protection when needed. In addition, a personal floatation device was required to be worn at all times on or over water. Used PPE was properly disposed of within the exclusion zone as investigation derived waste. Overall, CDM Smith saw no substantive deficiencies in PPE use.

In accordance with the Shannon & Wilson HASP, proper PPE for the USACE investigation fieldwork was modified Level D, requiring hard hat, safety glasses, nitrile gloves and heavy work gloves (when handling sediment core tubes), chemically protective safety boots, and hearing protection when needed. The U.S. Moorings Health and Safety Officer made wearing a hard hat within the core processing station optional since the work was carried out indoors (i.e., within a garage) minimizing the potential for overhead hazards. The use of Tyvek was also optional depending on the type of work being completed and the potential for splashing of contaminated soil or water.

Air monitoring was conducted by EHS Inc., a subcontractor to Shannon & Wilson, during core processing activities. Air monitoring was conducted within the interior of the garage in which the core processing station was located. The garage bay door was left open as were several windows during core processing to allow adequate ventilation.

3.2.3 Slip, Trip, and Fall Hazards

No slip, trip or fall hazards occurred during field activities.

A health and safety incident occurred on October 31, 2013 at 2:40 pm when a Shannon & Wilson field team member cut his thumb with a box cutter that slipped while he was using it to open the end caps off Core SD-104. The U.S. Moorings facility Health and Safety Officer was notified and a report was to be completed and filed. The cut was taken care of with minimal first aid at the site (i.e., Band-Aid).

3.2.4 Weather Hazards

No significant weather hazards were present during the NW Natural and USACE investigations, primarily because the work was performed during decent weather at the end of October and early November 2013.

Section 4
Deviations

4.1 Summary of Deviations and Field Change Requests

On October 28, 2013, Anchor QEA attempted to obtain a sediment core at the GS-01 location as proposed in their *Study Design for Sediment Characterization Adjacent to U.S. Moorings Site Required by EPA – Addendum 1 to the Project Area Identification Report Quality Assurance Project Plan* (Anchor QEA 2013). However, the river water level was too low for the core collection boat to access this location near the shoreline during the investigation. Anchor QEA discussed the issue in the field with CDM Smith and by phone with EPA. Anchor QEA submitted a FCR to EPA for approval on October 31, 2013 to document a proposed deviation to the sediment core collection method for this core. Anchor QEA proposed collecting the sediment core at the GS-01 location using a hand-driven coring device while the location was dry during an extremely low tide to occur around noon on November 1, 2013. EPA approved the FCR and a copy is provided in **Appendix D**.

As described in the November 1, 2013 description in Section 3.1.1, Anchor QEA experienced difficulties obtaining a sediment core to the targeted depth of 3 feet bml at the GS-01 location using the hand-driven coring device due to the rocky substrate and due to difficulties recovering sediment within the core tubes during extraction. Anchor QEA discussed the situation with EPA by phone. As a result, Anchor QEA submitted a second FCR to EPA for approval on November 5, 2013 to document a revised sampling approach to allow visual observations during excavation of the core tube from the subsurface using a hand shovel and visual logging of material in the sidewalls to attain the targeted depth. EPA approved the FCR and a copy is provided in **Appendix D**.

Section 5
References

Anchor QEA, LLC. 2012. *Draft Engineering Evaluation/Cost Estimate, Gasco Sediments Cleanup Site.* Prepared for U.S. Environmental Protection Agency Region 10 on behalf of NW Natural. May 2012.

Anchor QEA, LLC. 2013. Memorandum from Mr. Ryan Barth and Ms. Joy Dunay to Mr. Sean Sheldrake, U.S. Environmental Protection Agency, re: Study Design for Sediment Characterization Adjacent to U.S. Moorings Site Required by EPA – Addendum 1 to the Project Area Identification Report Quality Assurance Project Plan. July 18, 2013.

Shannon & Wilson, Inc. 2013. *Sediment Investigation Work Plan, Geotechnical and Sediment Investigation, U.S. Government Moorings, Portland, Oregon.* Prepared for U.S. Army Corps of Engineers, Seattle District. October 11, 2013.

U.S. Army Corps of Engineers. 2012. Letter from Ms. Christine Budai, Planning Programs and Project Management Division, to Mr. Sean Sheldrake, U.S. Environmental Protection Agency Region 10, re: Summary of Substantial Product in Sediment Cores, U.S. Government Moorings. August 14, 2012.

U.S. Environmental Protection Agency. 2012. Letter from Mr. Sean Sheldrake to Mr. Bob Wyatt, NW Natural, and Mr. Tom McCue, Siltronic Corporation, re: Substantial Project Evaluation at U.S. Moorings Site, Gasco Sediments Site. November 29, 2012.

U.S. Environmental Protection Agency. 2013a. Letter from Mr. Sean Sheldrake to Mr. Bob Wyatt, NW Natural, and Mr. Myron Burr, Siltronic Corporation, re: Review of Study Design for Sediment Characterization Adjacent to U.S. Moorings Site, Addendum 1 to the Project Area Identification Report Quality Assurance Project Plan, Gasco Sediments Site. August 15, 2013.

U.S. Environmental Protection Agency. 2013b. Letter from Mr. Sean Sheldrake to Mr. Bob Wyatt, NW Natural, and Mr. Myron Burr, Siltronic Corporation, re: EPA's Response to NW Natural's Response to EPA's Review of Study Design for Sediment Characterization Adjacent to U.S. Moorings Site, Addendum 1 to the Project Area Identification Report Quality Assurance Project Plan, Gasco Sediments Site. September 9, 2013.

Figures

Core Location

Navigation Channel

Feet

0 50 100 150 200

Q:\Jobs\1000029-02_Gasco\Maps\US_Moorings_Supp\US_Moorings_Actual_Inves_Locs.mxd nkochie 11/26/2013 1:25:33 PM

ANCHOR QEA

Figure 1
Core Locations
Sediment Characterization Adjacent to U.S. Moorings Site – Data Report
Gasco Sediments Cleanup Action

Legend

- Proposed Geotech Borehole Location
- Proposed Sediment Core Location
- Proposed New Dock Location

N

0 50 100 200 Feet

Date: 9/17/2013

Proposed
Geotechnical Boring and
Sediment Core Locations

U.S. Government Moorings

Figure 2

Appendix A
Field Notes

CDM
Smith

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CONTENTS

Reference Page Index

Location _____ Date _____

Project / Client _____

Location Casco - Portland Date 10/28/13

Project / Client Oversight of Substantial Product Investigation

1042 - Jeanette Mullin onsite.
Joy Dunay, Anchor
Doug Lafoon, Anchor onsite setting up exclusion zone for core processing area.
Purpose: Oversee core processing

Weather - Sunny clear ~48°F. Wind from the west.

Joy indicated they have collected first core and are working on second. Plan to bring cores onshore for processing by around 12:30 (on schedule).

1140 Photo #1 - Core processing area prior to start of activities

Photo #2 Another view of core processing area

JMM 10/28/13

Location Gasco - Portland Date 10/28/13

Project / Client Oversight of Substantial Product Investigation

1141 ~~Rbt~~ gmm Photo #3 Core processing prior to initiation of activities.

1230 SDDA-18-AQ and C528-AQ cores are being transferred into core processing area

SDDA-18-AQ Recovery 89% Recovered to 12.1 ft bml.

C528-AQ Recovery 75% Recovered to gmm 9.4 ~~7.2~~ ft bml

1235 Health and Safety briefing USACE onsite
Chris Budai Paul Vandenhorn
Mike Gross
Sharon Gelinas
Shawn Oliveira, CDM
Ryan Barth, Anchor

gmm 10/28/13

Location Gasco - Portland Date 10/28/13

Project / Client Oversight of Substantial Product Investigation

1258 Begin cutting SDDA-18-AQ Jet noted one section identified as C528. Anchor checked and then pulled correct section.

1328 Photo #4 SDDA-18-AQ 0 to 3 ft

1328 Photo #5 SDDA-18-AQ 0 to 3 ft

1329 Photo #6 SDDA-18-AQ 2 to 3 ft

1329 Photo #7 SDDA-18AQ 4 to 5 ft - Noted black being

1330 Photo #8 SDDA-18-AQ 6 to 7 ft

1331 Photo #9 SDDA-18-AQ 8 to 9 ft

1331 Photo #10 9 to 10 ft

1331 Photo #11 11 to 12 ft

1331 Photo #12 10 to 11 ft

gmm 10/28/13

Location Gasco Portland Date 10/28/13

Project / Client Oversight of Substantial Product Investigation

SDA-18-AQ - Log

0 - ~~3.7~~ 3.4 ft dark brown silty sand

3.4 - 3.7 sandy silt, dark brown black band at 3.7 ft, 1 in thick

3.7 - 4.5 ft dark brown silty sand

* 4.5 ft - 4.6 ft Black band, separated by thin layer of non-black, then 4.6 ft to 4.7 ft - black band, no sheen (4.5 ft to 4.7 ft band separated by very thin layer - organics (wood fragments or roots within layer)

Slight hydrocarbon odor

- 5.83 ft to 5.89 black layer
- 7.8 ft sand content increasing
- 8.5 ft Poorly sorted sand, dark brown, Med. grained to 12.3 ft

- Anchor grabbed sample from black layer from 4.5 to 4.7 ft.

gmm 10/28/13

Location Gasco Portland Date 10/28/13

Project / Client Oversight of Substantial Product Investigation

1405 Anchor archiving samples from ~~0~~ 3 - 4 ft bml, 4 - 8 ft bml, 8 - ~~12.3~~ 9 ft bml from SDA-18-AQ and 0 - 1 ft bml

1433 Ryan Barth indicated that EPA has agreed that collection of GS-01 will not occur due to low water conditions making site inaccessible to boat. Only 4 cores will be collected for this event. Bill Jaworski boat contractor indicated the closest he could get to site GS-01 is approximately 50 feet away (halfway between SD-BG and GS-01)

All four cores have been collected. Boat is coming to shore to drop off cores.

1500 Core C528 cut open. (C528-AQ)

gmm 10/28/13

Location Gasco - Portland Date 10/28/13

Project / Client Oversight of Substantial Product Investigation

C528-AQ Log

0-9.3 ft dark brown sandy silt; chunk of wood at 0.4 ft
- dark black band at 5.8 ft one-inch thick. ~~No~~ slight hydrocarbon odor
- thin seam at 7.8 ft (not continous layer, but pebbly) black with no odor

---

1509 Photo #13 C528 0 to 1 ft bml
1509 #14 C528 1.5 to 3 ft bml
1509 #15 C528 3 to 5 ft bml
1511 #16 C528 3 to 5 ft bml
1511 #17 C528 4.5 to 6 ft bml
1512 #18 C528 5 to 6 ft bml
1512 #19 8 to 9 ft - C528
1512 #20 C528 7.5 to 9.3 ft bml
1512 #21 C528 6 to 7.5 ft bml

Anchor collecting samples to archive, from 0 to 4 ft, 4 to 8 ft 8 to 9.3 ft, 0 to 1 ft

1540 USACE representative offsite.

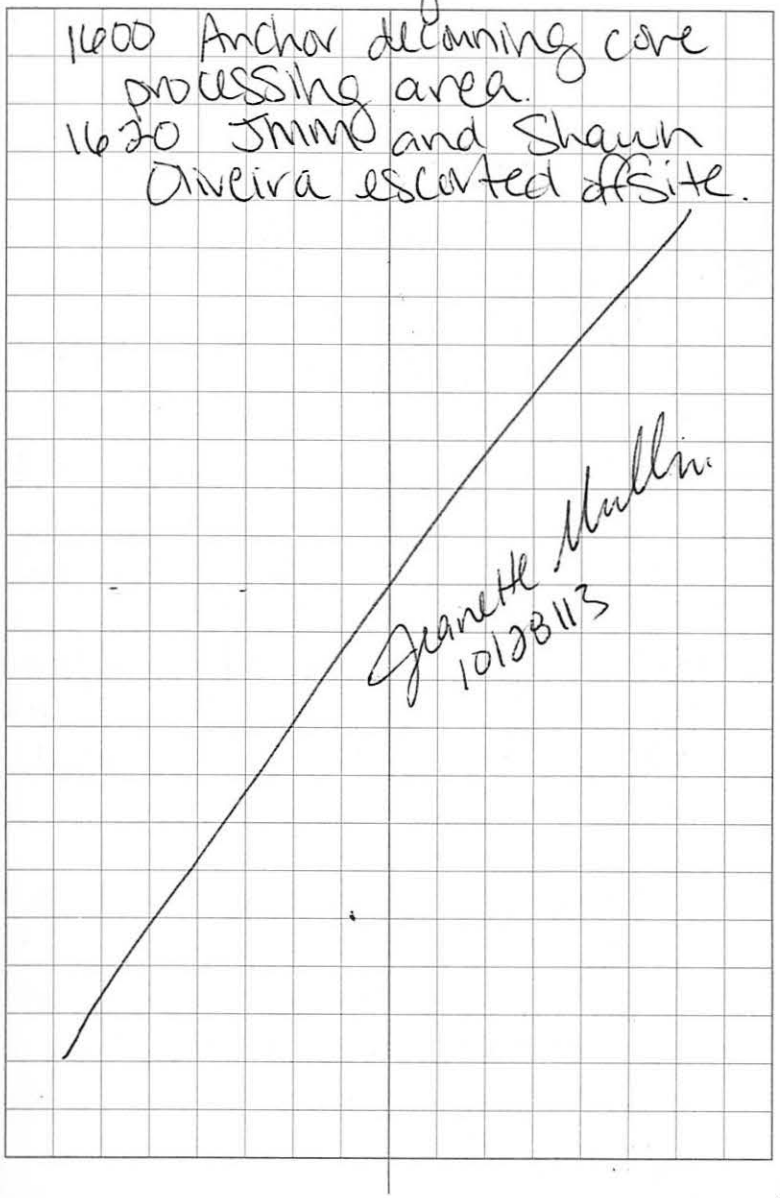
jmm 10/28/13

Location Gasco - Portland Date 10/28/13

Project / Client Oversight of Substantial Product Investigation

1600 Anchor decanning core processing area.

1630 Jmm and Shawn Oliveira escorted offsite.



Location Gasco - Portland Date 10/29/13

Project / Client Oversight of Substantial Product Investigation

0815 Jet Mullin onsite.
Anchor staff prepping core processing area.
Ryan Barth, Anchor
Joy Shaw, Anchor
Keira
0830 USACE staff onsite
Mike Gross
Sharon Gelinas
Weather - Clear, sunny, cold ~41°F
- Purpose: Review 20-BF-AQ and 50-BG-AQ cores
0835 Health & Safety briefing
0840 ~~20-BF-AQ~~ 96% recovery
0900 Core 20-BF-AQ opened.
Length 13.1 ft
20-BF-AQ
0-13.1 ft dark brown sandy silt
10.1 ft thin mottled black band approximately 1 inch, no odor
10.9 ft thin band of black no odor, no sheen

gmm 10/29/13

Location Gasco - Portland Date 10/29/13

Project / Client Oversight of Substantial Product Investigation

~~10.1~~ 11.7 mm to 11.8 ft - dark black band approx. 1 inch thick, hydrocarbon odor, no sheen
20-BF-AQ
0914 Photo #22[50] 0-1 ft bml
0914 Photo #23[51] 1-2 ft bml
0915 Photo #24[52] 1-2 ft bml
0915 Photo #25[53] 2-3 ft bml
0915 Photo #26[54] 4-5 ft bml
0915 Photo #27[55] 5-6 ft bml
0915 Photo #28[56] 6-7 ft bml
0915 Photo #29[57] 8-9 ft bml
0916 Photo #30[58] 9-10 ft bml
0916 Photo #31[59] 11-12 ft bml
0916 Photo #32[60] 12-13 ft bml
0916 Photo #33[61] photo of black band at 11.7 ft bml

Anchor archived samples from 0-1 ft bml, 1-4 ft bml, 4-8 ft bml, 8-12 ft bml, and 12-13.1 ft bml
1000 Chris Budai, USACE arrives onsite

gmm 10/29/13

Location Gasco-Portland Date 10/29/13

Project / Client Oversight of Substantial Product Investigation

1030 Anchor begins cutting open Core 50-BG-AQ.
Core length 13.9 ft

0 - ~~2~~ gm 1.9 dark brown silty sand
1.9 - 2.5 dark brown/black wood waste
2.5 - 5.7 ft dark brown sandy silt
5.7 - 5.95 dark black band, strong hydrocarbon odor, 2.5 inches thick
5.95 - 7.7 ft dark brown sandy silt
7.7 ÷ 7.95 ft dark black band, strong hydrocarbon odor, approx 3 in thick
slight sheen 8.25 - 8.4 sheen visible, dark brown on wood waste, hydrocarbon odor
8.85 - 9.05 Black band 2 inches thick, hydrocarbon odor
10.15 - 10.35 Black band slight sheen, hydrocarbon odor, ~2 inches thick

gmm 10/29/13

Location Gasco-Portland Date 10/29/13

Project / Client Oversight of Substantial Product Investigation

12.9 - 13.05 Black band, less than 2 inches thick, approximate 1 inch

13.55 - 13.61 black band, less than 1 inch thick

1 to 13.9 dark brown sandy silt except where black bands are noted.

No substantial product identified - as all layers over 2 inches thick are noted below 5 ft bml and no dredging planned.

50-BG-AQ Photos

1055	Photo #34 03	0 - 1 ft bml
1055	Photo #35 04	1 - 2 ft bml
1055	Photo #36 05	3 - 4 ft bml
1055	Photo #37 06	5 ft bml
1055	Photo #38 07	6 - 7 ft bml

gmm 12/29/13

Location Casco - Portland Date 10/29/13

Project / Client Oversight of Substantial Product Investigation

1055 Photo #39 [66] 8 ft bml
1055 Photo #40 [69] 9-10 ft bml
1056 Photo #41 [70] 11 ft bml
1056 Photo #42 [71] 12-13 ft bml
1056 Photo #43 [72] 13 ft bml
1056 Photo #44 [73] 13 ft bml

1130 Anchor archiving samples from 0-1 ft bml, 1-4 ft bml, 4-8 ft, 8-12 ft bml, 12-13.9 ft bml

1230 Jet Mullin offsite.

Jeanette Mullin
10/29/13

Location Casco - Portland Date 10/30/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

0815 Jet Mullin onsite at USACE US Moorings site. Check in at office. Weather - Cloudy, cold, approx. ~40° F

0830 Health & Safety briefing Led by Greg Vincent, USACE Facility Ops Officer. Purpose: Observe processing of cores collected by USACE at US Moorings offshore area.

Mike Gross, USACE
Lynn Daniels, USACE
Joy Dunay, Anchor

0840 Sharon Gelinas, USACE onsite. Core processing area being prepped. SGW

Paul Van Horne onsite, ~~USACE~~ Paul gives project-specific safety briefing. LMM

Clint, EHS will be performing air monitoring

LMM 10/30/13

Location Gasco - Portland Date 10/30/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

Mike Gross informed us that 5 cores have been collected.

gmm ~~SD107~~ SD106
SD101
SD102
SD103
and another core located in center of dock area to replace proposed location SD105 (near Anchor's GS-01 location that they were also unable to collect due to low water).

- They collected 14ft cores instead of 20 ft cores
- Paul Van Horne, Shannon & Wilson will be processing the cores

0942 gmm Begin to cut open SD101

Photo #45 74 Core processing
Photo #46 35 Core processing area

gmm 10/30/13

Location Gasco - Portland Date 10/30/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

0944 Photo #47 74 cutting open core SD101

1000 Chris Budai, USACE onsite

1002 Photo #48 74 - view of core cutting process

SD101 length = 11.1 ft

0 - 11.1 dark brown sandy silt
- wood debris @ 6.65ft bml
- wood debris @ 7.75 bml
- darker black layer @ 8.34ft to 8.8 ft. bml, wood chunk
@ 8.8 ft ← in this layer, separated by dark brown interbedded layers, layer @ ~~8.83 to~~ gmm 8.32 to gmm 8.45 ft
no sheen with layer - layer has ~~strong~~ hydrocarbon but is less than 2 inches thick
sheen test - dark layer @ 9.05 to 9.4, approximately ~~8~~ gmm 4 inches strong hydrocarbon odor, no sheen w/ sheen test

gmm 10/30/13

Location Gasco - Portland Date 10/30/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

1054 Photo #49 80 0-1 ft SD101
1054 Photo #50 81 1-2 ft SD101
1054 Photo #51 82 4-5 ft SD101
1055 Photo #52 83 5-6 ft SD101
1055 Photo #53 85 7-8 ft SD101
1055 Photo #54 86 9-10 ft SD101
1055 Photo #55 87 10-11.1 ft SD101
1114 Photo #56 88 View of layer @ 9.05 to 9.4 ft bml

- Wood debris in shoe of core has very strong creosote-type odor. This odor is stronger than hydrocarbon odor in 9.4 layer
- Thin black banding in layer from 9.7 to 11.1 ft bml. Wood debris located throughout with strong creosote-type odor
- Sharon Gelinas, USACE believes layer at 9.05 ft bml to 9.4 ft qualifies as substantial product pending verification of dredge depth

gmm 10/30/13

Location Gasco - Portland Date 10/30/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

8.3 ft wood chunks contain creosote-like odor
8.8 ft - 3 inch wood chunk
9.0 - 9.4 S&W staff indicate this interval contains hydrogen sulfide odor, 10% fines, faint wood preservative odor, 15% organics, sand

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1305 S&W opening core SD102
EHS - Inc. ran OVM-PID over core and noted no VOCs.

Recovery 12.6 ft bml with shoe contents; 12.1 ft recovery (not counting shoe contents)
0 - 12.6 ft - dark brown sandy silt

gmm 10/30/13

Location Gasco-Portland Date 10/30/13

Project / Client Oversight of Substantical Product Investigation US Moorings

- Thin black band at 2.65 ft bml approx ¼ inch thick
- Slight discoloration black banding at 7.1 to 7.4 but is mottled and not continuous - wood fragments noted
- Slight dark banding @ 7.8 to 8 ft bml
- At 8.2 to 8.8 ft bml, black mottling with wood fragments
- At 9.2 to 10.25 black mottling with numerous wood fragments, hydrogen sulfide odor
- At 10.4 to 12.1 black mottling w/ wood fragments hydrogen sulfide/ creosote odor

SD-102

1340	Photo #57	89	0 - 1 ft bml
1340	Photo #58	90	1 - 2 ft bml
1340	Photo #59	91	3 - 4 ft bml
1340	Photo #60	92	4 - 5 ft bml
1341	Photo #61	93	6 - 7 ft bml

gmm 10/30/13

Location Gasco-Portland Date 10/30/13

Project / Client Oversight of Substantical Product Investigation - US Moorings

1341	Photo #62	94	7 to 8 ft bml
1341	Photo #63	95	9 ft bml
1341	Photo #64	96	10 to 11 ft bml
1341	Photo #65	97	11 to 12.1 ft bml

1510 Begin cutting open Core SD-1060 - recovered 13.5 gmm → ~~13.5+~~ ft bml, total of 14.1 feet with shoe.

- 0 - ~~13.1~~ ft bml - dark brown sandy silt 13.5 gmm
- Thin black band from 0.4 to 0.5 ft bml, approximately 1 inch thick; wood debris; hydrocarbon odor
- Mottled very thin layers, hydrocarbon odor from 2.05 ft to 2.3 ft bml
- Thin black bands, less than ¼ inch from 2.9 to 3.0 ft
- Thin black band at 3.65 ft
- At 4 ft bml, wood fragments large wood chunks, black coloring

gmm 10/30/13

Location Gasco - Portland Date 10/30/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

- From 4 to 4.75 ft bml black bands with wood chunks and sheen
- Black layer from 4.58 to 4.71 ft bml (just short of 2 inches) hydrocarbon odor and sheen. USACE believes this is larger layer and therefore is substantial product
- 5 ft to 5.2 ft contains sheen and wood fragments but is still brown in color
- 5.5 ft to 5.74 black band with hydrocarbon odor, sheen, wood fragments and organics, slightly over 2 inches in thickness
- 6.5 to 7.1 black banding interbedded with brown layers
- 7.48 to 7.6 black band less than 2 inches, saturated with product visible on gloves with handling but is not free ~~pro~~ product

JMM 10/30/13

Location Gasco - Portland Date 10/30/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

- 8.47 to 8.52 - Thin matted black band
- 9 ft to 9.25 black band, sheen (2.4 inches thick)
- Void at 9.7 to 10.5 (note change for depth on following depth measurements - need to calculate void to correct depth but has not been done in these notes as reference tape in place)
- Black band 10.1 to 10.2 - hydrocarbon odor, no sheen
- Black band at 11.2' to 11.35, hydrocarbon odor, sheen dig hole in layer to see if product would ooze in, no product observed
- Thin black band 12.7 to 12.75
- Thick black band at 13.1 to 13.35, approximately 3 inches thick, hydrocarbon odor (slight)

JMM 10/30/13

Location Gasco - Portland Date 10/30/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

- Thin black band at 13.45 less than 1/4 inch thick
- Black band approximately 1-inch thick at 13.72 to 13.78

Core SVJ-106

1545	Photo #66	98	0-1 ft bml
1545	Photo #67	99	1-2 ft bml
1546	Photo #68	100	2-3 ft bml
1546	Photo #69	101	3-4 ft bml
1546	Photo #70	102	4-5 ft bml
1546	Photo #71	103	5-6 ft bml
1547	Photo #72	104	6-7 ft bml
1547	Photo #73	105	7-8 ft bml
1547	Photo #74	106	8-9 ft bml
1547	Photo #75	107	9-10 ft bml
1547	Photo #76	108	10-11 ft bml
1548	Photo #77	109	11-12 ft bml
1548	Photo #78	110	12-13 ft bml
1548	Photo #79	111	13 ft bml
1614	Photo #80	112	Layer 2 4.58 ft bml
1614	Photo #81	113	Layer 2 4.58

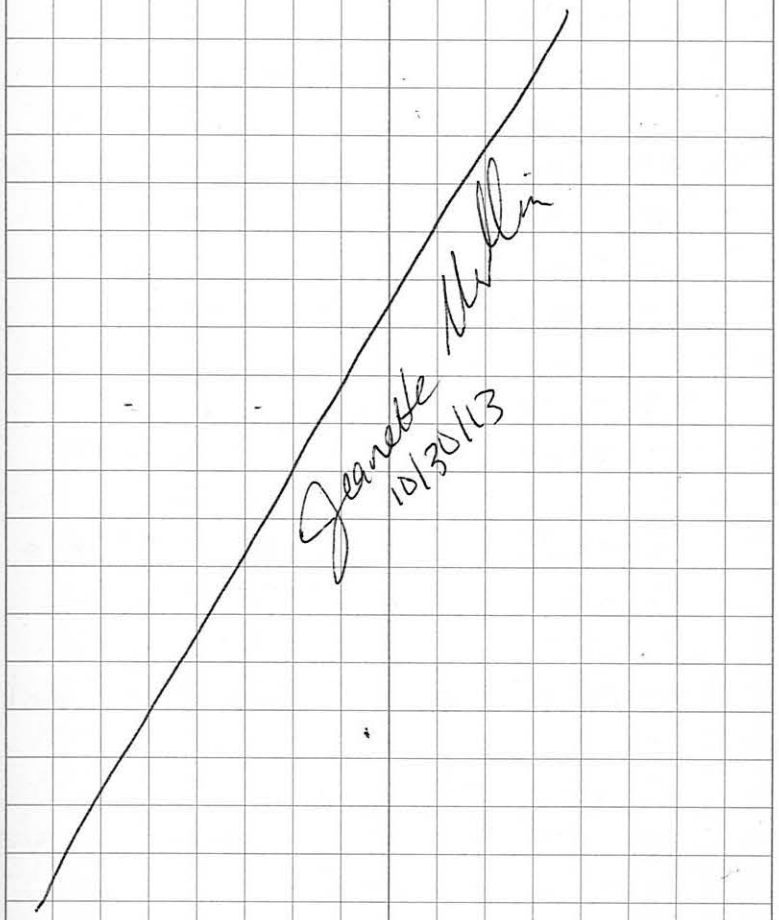
ft bml

gmm 10/30/13

Location Gasco - Portland Date 10/30/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

1715 Jet Mullin offsite. Scheduled to re-begin core processing tomorrow at 08:00.



Location Gasco - Portland Date 10/31/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

gmm ~~08~~ 0745 Jet Mullin onsite. Paul Van Horne, Shannon Wilson prepping core processing area. Paul conducted Health and Safety briefing.

Purpose: Continue to observe processing of USACE sediment cores from US Moorings.
Weather - Cloudy, rain predicted, approx. 51° F

0815 Paul Van Horne begins cutting open core SD-103

SD-103 core length = 13.96 ft bml including shoe, but void at 11.6 to 11.85 so actual recovery 13.70 ft bml

Core SD-103
0 - 13.95 dark brown sandy silt with varying amounts of sand - increasing at 11.8

gmm 10/31/13

Location Gasco - Portland Date 10/31/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

7.98 - 8.02 - Thin band of medium sand
7.56 - fragments of wood
8.05 - paint chip (large)
8.28 - 8.32 - Black mottling but not a solid band
11.85 - 12.1 becomes darker, no sheen ~~no~~ faint hydrocarbon odor (not quite black), no sheen w/ sheen test
13.35 - 13.55 dark black band, hydrocarbon odor, no sheen produced with sheen test, no sheen

SD-103

0851	Photo # 82	114	0 - 1 ft bml
0851	Photo # 83	115	1 - 2 ft bml
0851	Photo # 84	116	3 - 4 ft bml
0852	Photo # 85	117	5 ft bml
0852	Photo # 86	118	6 - 7 ft bml
0852	Photo # 87	119	7 - 8 ft bml
0852	Photo # 88	120	8 - 9 ft bml
0853	Photo # 89	121	9 - 10 ft bml
0853	Photo # 90	122	11 ft bml
0853	Photo # 91	123	12 - 13 ft bml

gmm 10/31/13

Location GASCO - Portland Date 10/31/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

0853 Photo # 92 104 13-13.9 ft bm)

No substantial product identified in SB-103.

0940 Shannon & Wilson begins to cut open Core SB-109

0820 USACE staff onsite: Mike Gross, Sharon Gelings, Lynn Daniels

0945 Chris Budai, USACE onsite

Core SB-109 - Recovery is 13.9 ft bml out of 14 foot core

0-13.9 dark brown sandy silt

7.45 ~~this~~ 2cm thin med-grained sand layer

8.72 - 8.78 ft bml - darker brown coloring

gmm 10/31/13

Location GASCO - Portland Date 10/31/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

8.9 - 9.05 black layer, hydrocarbon odor, no sheen, 2-inches thick, broken sheen produced with sheen test, odor is not super strong, but noticable

9.36 - 9.47 black layer, decomposed wood fibers, hydrocarbon odor, layer is less than 2-inches in thickness

9.65 - 10.65 alternating thin layers of black banding and dark brown layers

11.53 - 11.6 wood fragments, hydrogen sulfide odor

12 - 12.03 Thin black band less than 2 inches

12.1 - 12.18 thin black band less than 2 inches

12.33 - 12.8 alternating mottled black layers

gmm 10/31/13 Sheen produced with sheen test slight hydrocarbon odor

Location Gasco-Portland Date 10/31/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

12.95 - 13.05 Black layer, slight hydrocarbon odor, no sheen, broken sheen produced with sheen test

gmm ~~12~~ 13.42 - 13.7 black mottling, alternating layers

8.9 - 9.05 layer is exactly 2 inches and may qualify as substantial product pending dredge depth determination. Layer appears saturated, but note that odor is not super strong. No sheen visible but broken sheen produced with sheen test. No blebs visible.

Core SD-109

1018	Photo #93	125	0-1 ft bml
1018	Photo #94	126	1-2 ft bml
1018	Photo #95	127	2-3 ft bml

gmm 10/31/13

Location Gasco-Portland Date 10/31/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

1019	Photo #96	128	3-4 ft bml
1019	Photo #97	129	4-5 ft bml
1019	Photo #98	130	5-6 ft bml
1019	Photo #99	131	6-7 ft bml
1019	Photo #100	132	7-8 ft bml
1019	Photo #101	133	8-9 ft bml
1030	Photo #102	134	9-10 ft bml
1030	Photo #103	135	10-11 ft bml
1030	Photo #104	136	11-12 ft bml
1030	Photo #105	137	12-13 ft bml
1030	Photo #106	138	13-13.9 ft bml
1045	Photo #107	139	View of 8.9 layer
1046	Photo #108	140	Another view of black layer at 8.9-9.05 ft

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1155 Shannon & Wilson begins cutting opening Core SD-107. Paul Van Hoval indicated that Bill Jawarski hit resistance several times trying to collect this core and they moved it slightly from planned location due to refusal

gmm 10/31/13

Location Casco-Portland Date 10/31/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

SD-107

0 - 6.4 dark brown sandy silt

gmm ~~6.4 - 7.38~~

5.4 - 5.44 Black band less than 2-inches, slight hydrocarbon odor, contains organic debris

6.4 - 7.38 Silty sand with large percentage of organics, rootlets, approx 75% organics, hydrogen sulfide smell

7.53 Color begins to grade to black, black band at 7.7 to 7.83, no sheen, slight hydrocarbon odor, no sheen produced with sheen test

7.7-7.83

8.32 - 8.4 black band hydrocarbon odor, no sheen, less than 2-inches thick, not continous through core, no sheen w/ sheen test

gmm 10/31/13

Location Casco-Portland Date 10/31/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

1st test

No sheen with sheen test

8.6 - 8.75 Wood waste fragments, slight creosote-like odor cobble less than 2-inches in thickness

2nd test broken sheen very slight

9.0 - 9.1 Med sand, black with wood fragments, sheen, creosote-like odor ~~but~~ and hydrocarbon odor, broken sheen produced with sheen test, clay/silt brown located on one side of core tube, layer does not penetrate through

sand only

9.36 - 9.42 Black layer, sheen, less than 2 inches in thickness

9.68 - 10.91 Mottled layers of black and dark brown no odor

10.2 - 10.5 organics mixed with silty sand, hydrogen sulfide odor

gmm 10/31/13

Location Gasco-Portland Date 10/31/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

SD107 Total core length 10.5 ft out of 14 foot core (including shoe contents)

- No substantial product identified SD107

1227 Photo #109 141 0-1 ft bml
1227 Photo #110 142 1-2 ft bml
1228 Photo #111 143 2-3 ft bml
1228 Photo #112 144 3-4 ft bml
1228 Photo #113 145 4-5 ft bml
1228 Photo #114 146 5-6 ft bml
1228 Photo #115 147 6-7 ft bml
1229 Photo #116 148 7-8 ft bml
1229 Photo #117 149 8-9 ft bml
1229 Photo #118 150 9-10 ft bml
1229 Photo #119 151 10-10.5 ft bml

1425 Shannon & Wilson begins cutting open SD-104
1440 Paul Van Horne cuts thumb opening end cap on core. US Mooring facility H&S Officer informed. First aid

gmm 10/31/13

Location Gasco-Portland Date 10/31/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

administered. Wash and bandage minor cut.

SD-104 - discontinuous lenses

Recovered length = 12.15 ft bml / 14-ft core

0 - 4.35 dark brown sandy silt

4.35 - 4.95 poorly graded med-grain sand with interbedded pockets of dark brown ~~silt~~ gmm sandy silt

4.95 - 12.15 dark gray sand, poorly sorted, med grain subangular to subrounded

10.93 pocket of dark brown silt in sand

11.06 - 11.13 (pocket of dark brown silt with sand matrix

11.25 pockets of silt (small pebble-like) in sand matrix

11.55 pockets of silt in sand matrix

gmm 10/31/13

Location Gasco - Portland Date 10/31/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

SD 104

1.25 - 1.28 dark black band, slight hydrocarbon odor, less than 2 inches thick

1.65 - 1.7 dark black band, slight hydrocarbon odor, less than 2 inches, band thins through core

2.13 - 2.23 dark black band, slight hydrocarbon odor

2.6 - 2.77 sheen noted on dark brown sandy silt, faint hydrocarbon odor

Core void from 10.65 to 10.82 (need to adjust core recovery)

Sheen Test results

gmm ~~3.15~~ 2.15 Broken sheen (few specks) minor

1.65 No sheen

1.25 No sheen (1 speck)

gmm 10/31/13

Location Gasco - Portland Date 10/31/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

1509	Photo #120	152	0 - 1 ft bml
1510	Photo #121	153	1 - 2 ft bml
1510	Photo #122	154	2 - 3 ft bml
1510	Photo #123	155	3 - 4 ft bml
1510	Photo #124	156	4 - 5 ft bml
1510	Photo #125	157	5 - 6 ft bml
1511	Photo #126	158	6 - 7 ft bml
1511	Photo #127	159	7 - 8 ft bml
1511	Photo #128	160	8 - 9 ft bml
1511	Photo #129	161	9 - 10 ft bml
1511	Photo #130	162	10 - 11 ft bml
1511	Photo #131	163	11 - 12 ft bml
1512	Photo #132	164	12 - 12.15 ft bml

SD 104

No substantial product identified in this core.

- Scheduled to complete processing of last core tomorrow @ 0830.

1600 Jeanette Mullin offsite

Jeanette Mullin 10/31/13

Location Gasco - Portland Date 11/1/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

0800 Jet Mullin onsite. Return call from Lance Peterson. Informed that EPA had approved Anchor's (NW Natural's) plan to collect a core at the GS-01 location. They are waiting for low tide which is anticipated around 12:00.

0810 Informed Mike Gross, USACE who had just arrived of additional core collection at GS-01 and Anchor's potential request to use core processing area.

0825 Joy Duvall, Anchor onsite. Shannon Gelinas, USACE also onsite. Joy indicated Anchor will set up their own processing area so Shannon & Wilson can begin tear down.

gmm 11/1/13

Location Gasco - Portland Date 11/1/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

Weather: Cloudy, low 50s.
Purpose: Oversee processing of last core collected by USACE's contractor, S&W (SD-108)

Paul Van Horne had already cut SD-108 core prior to arrival but had not opened it yet.

SD-108 59% recovery with a 20-foot core per Paul Van Horne as shown on S&W log. However actual recovery, as noted from tape measure, is 14.3 ft bml including the shoe which is 97% recovery.

gmm 11/1/13

Location Gasco - Portland Date 11/1/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

SD-108

0 - 8.2 dark brown sandy silt

8.2 - 9.2 dark gray sand with silt pockets, silt is dark brown

9.2 - 12.2 dark gray sand, poorly sorted, med.-fine grain, subrounded

12.2 - 12.7 dark brown silt

12.7 - ~~13~~ gm 13.35 dark gray sand (as above)

13.35 - 13.57 med sand w/ brown organics

13.57 - 14.3 dark gray sand (as above) with pocket of dark brown silt

gm ~~8.72 - 6.72 - 6.8~~ med-fine sand layer

Black Layers observed in SD-108

2.54 - 2.59 Black layer, slight hydrocarbon odor, no sheen, broken sheen (few specks) with sheen test, less than 0.5-inches

gm 11/1/13

Location Gasco - Portland Date 11/1/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

SD-108

Observed black layers

3.13 - 3.15 black layer, no sheen, very faint hydrocarbon odor, less than 0.5-inches thick

3.47 - 3.52 black mottling, interbedded layers of black and brown, very faint hydrocarbon odor

4.25 - 4.43 Black mottling / banding but not pervasive

4.79 - 4.93 black mottling / banding but not solid throughout layer, no odor, no sheen

6.1 - 6.15 black band, no odor, no sheen, no sheen produced with sheen test

7.23 - 7.33 black layer, slight hydrocarbon odor, no sheen, broken sheen (specks) produced with sheen test

gm 11/1/13

Location Gasco - Portland Date 11/1/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

7.33 - 7.61 black mottling/banding but not pervasive through this interval

~~12.7~~ 12.24 - 12.46 black banding/mottling but not pervasive through layer

No layers identified that met substantial product criteria.

SD-108 Photos

0919	Photo # 133	165	0 - 1 ft bml
0919	Photo # 134	166	1 - 2 ft bml
0919	Photo # 135	167	2 - 3 ft bml
0919	Photo # 136	168	3 - 4 ft bml
0919	Photo # 137	169	4 - 5 ft bml
0920	Photo # 138	170	5 - 6 ft bml
0920	Photo # 139	171	6 - 7 ft bml
0920	Photo # 140	172	7 - 8 ft bml
0920	Photo # 141	173	8 - 9 ft bml
0920	Photo # 142	174	9 - 10 ft bml
0920	Photo # 143	175	10 - 11 ft bml

gmm 11/1/13

Location Gasco - Portland Date 11/1/13

Project / Client Oversight of Substantial Product Investigation - US Moorings

0921	Photo # 144	176	11 - 12 ft bml
0921	Photo # 145	177	12 - 13 ft bml
0921	Photo # 146	178	13 - 14.3 ft bml

1005 Jet Mullin and Joy Sunay, Anchor offsite US Moorings facility.

1015 Jet Mullin and Joy Sunay, Anchor, onsite at Gasco property pending collection of core at GS-01 location.

1035 Arrive at GS-01 location. Anchor had marked the GS-01 location in past for surveying purposes and marker was still in position.

1027 Photo # 147 179 View of Anchor core processing area

1027 Photo # 148 180 Another view of Anchor core processing area

gmm 11/1/13

Location Casco - Portland Date 11/1/13

Project / Client Oversight of Substantial Product Investigation

1041 Photo #149 [181] View of upstream side of US Moorings dock

1041 Photo #150 [183] Another view of upstream side of US Moorings dock.

1057 Drive 42 inches, 4 foot core in first attempt

1105 Attempt 2nd 4-foot core at slightly different location. 10-inches of material in core. Plastic core end folded over, likely by rock

1112 Attempt 3rd core. Dig 6-inches to remove rip-rap rocks. Material lost from 2nd core attempt. Reuse plastic core. Dig to sand/silt interface. ~~Drive~~ 18-inches of sediment in core. + 6 inches removed by digging gmm 11/1/13

Location Casco - Portland Date 11/1/13

Project / Client Oversight of Substantial Product Investigation

3rd attempt core drive = 36 in. Bottom of tube smashed. Lost material while pulling out core.

Dug with a shovel around core during attempt to pull out core. Dark gray ~~SP~~ silty sand, no black staining identified in wall of hole or in sediment removed. hole - approximately 2 feet deep. Unable to dig deeper due to inflow of water and sloughing

6 inches of red oxidized sand, rip-rack rocks then-lain by gray silty sand, broken, slight sheen on surface of water

Location Gasco - Portland Date 11/1/13

Project / Client Oversight of Substantial Product Investigation

Anchor digging at 1st core. Observed sidewall. Hole is 2ft 2 in deep. Some sheen located on surface. No odor.

1057 Photo #151 (154) View of Anchor during 1st core at GS-01

1108 Photo #152 (155) 2nd core attempt photo

1142 Photo #153 (155) View of hole filled with water with sheen

1211 Photo #154 (194) Remaing 1st core, view of sidewall

1214 Photo #155 (195) Water with sheen from removal of 1st core

1224 Photo #156 (196) View of US Mooring dock from Gasco

gmm 11/1/13

Location Gasco - Portland Date 11/1/13

Project / Client Oversight of Substantial Product Investigation

1240 Anchor brought 1st core back for viewing at Gasco core processing area.

1253 Anchor opening up the core, 1st core attempted at GS-01 location

Recovered gmm 1.6 ~~1.55~~ feet

GS-01-AC Attempt #1

1258 Photo #157 (197) 0 to 1 ft bml

1258 Photo #158 (198) 1 to 1.6 ft bml

-0.6 - 1.6

Fine-grained sand, gray

0 - 0.6 cobbles, rocks, pebbles, red oxidized sand

No discoloration noted, no black staining or layers, no odor noted in recovered core

- some black spotty areas noted in removed sediment but sporadic and no odor

gmm 11/1/13

Location Casco-Portland Date 11/1/13

Project / Client Oversight of Substantial Product Investigation

1328 look at sediment removed from holes at GS-01. Sediment from 1st attempt holes. Some minor black mottling, no odor. No layers identified of substantial product.

1330 Photo #159 - View of sediment from 1st attempt hole at GS-01

1345 Jet Mollin offsite

Jeanette Muller
11/1/13

Location Date

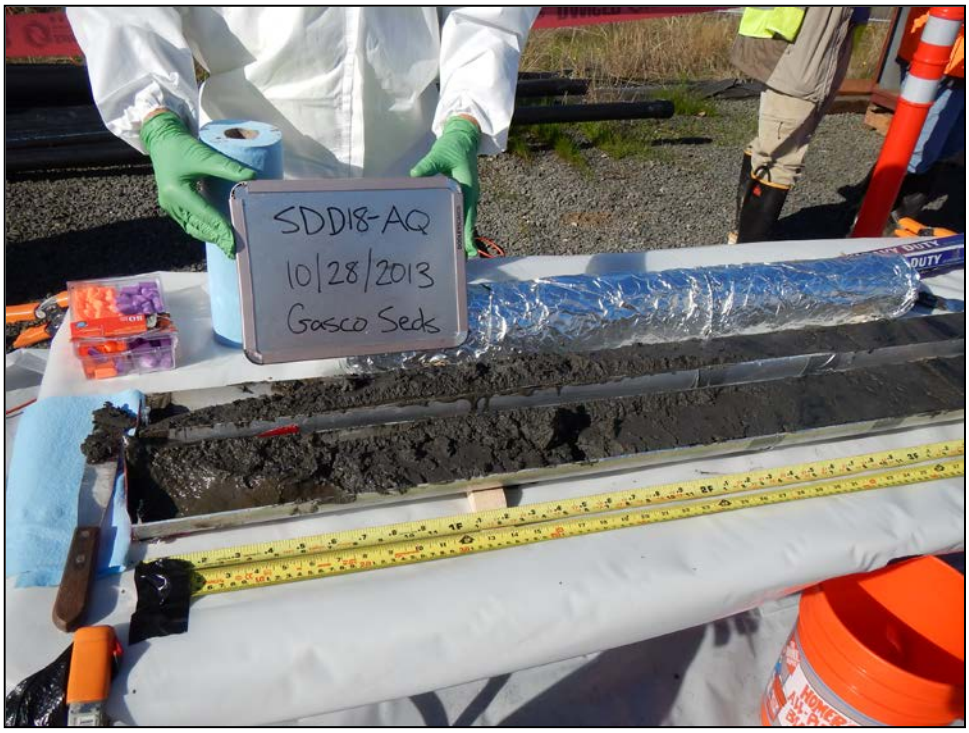
Project / Client

Appendix B
Field Oversight Photographs

FIELD PHOTOGRAPHY LOG SHEET
U.S. Moorings Substantial Product Investigation

October 28, 2013

Core SDDA-18-AQ: 0 to 3 feet below mudline (bml)



Core SDDA-18-AQ: 0 to 3 feet bml

FIELD PHOTOGRAPHY LOG SHEET
U.S. Moorings Substantial Product Investigation

October 28, 2013

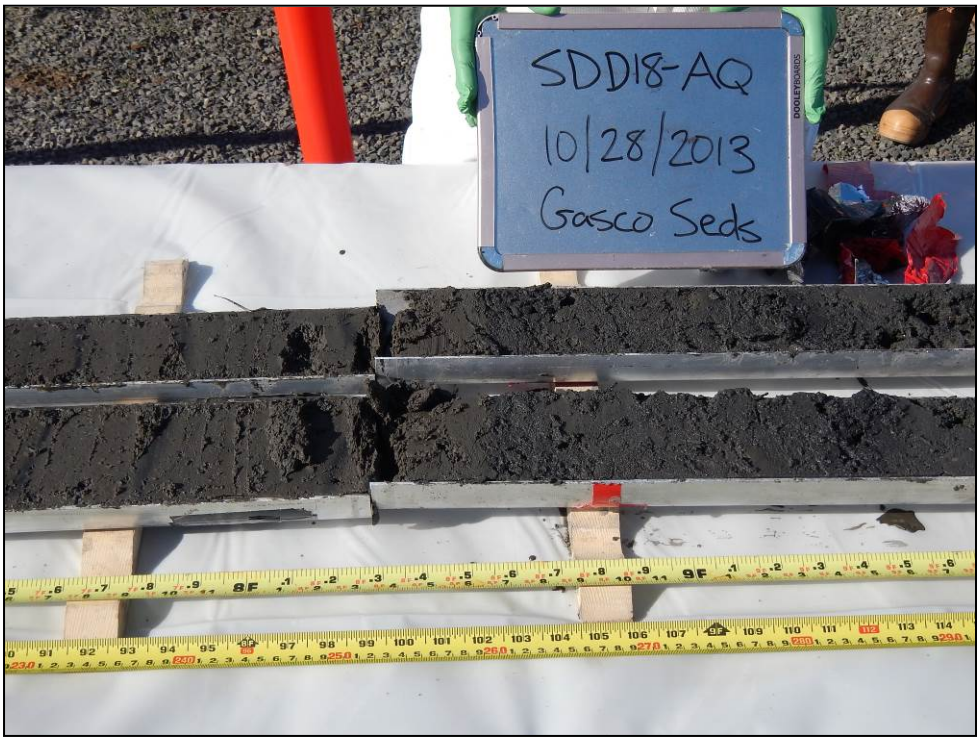
Core SDDA-18-AQ: 2 to 3 feet bml

Core SDDA-18-AQ: 4 to 5 feet bml

FIELD PHOTOGRAPHY LOG SHEET
U.S. Moorings Substantial Product Investigation

October 28, 2013

Core SDDA-18-AQ: 6 to 7 feet bml

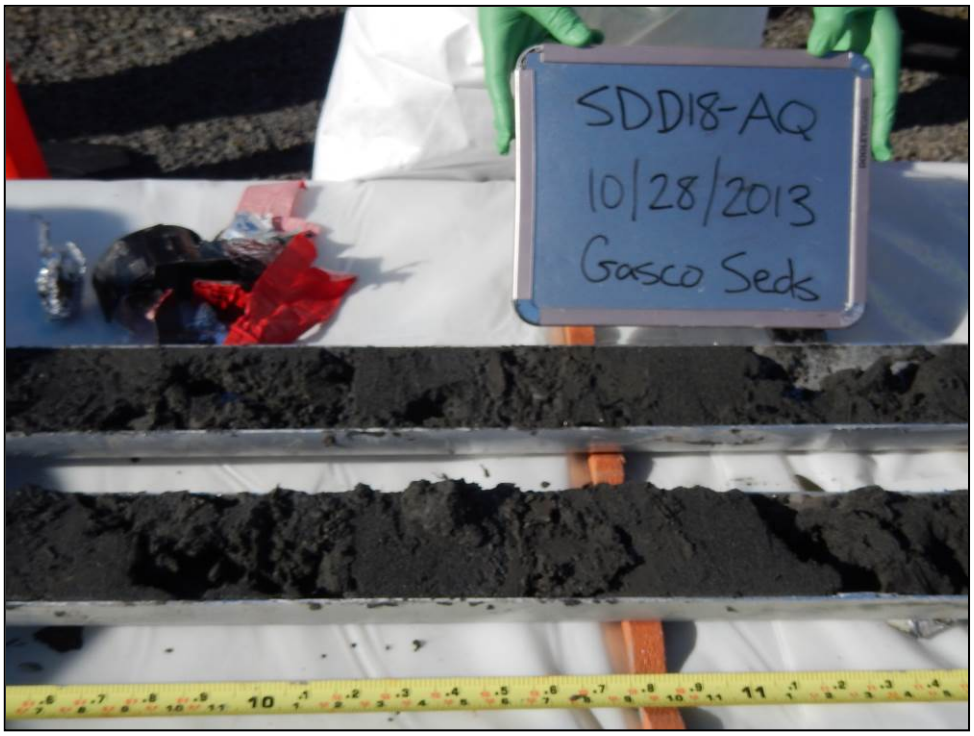


Core SDDA-18-AQ: 8 to 9 feet bml

FIELD PHOTOGRAPHY LOG SHEET
U.S. Moorings Substantial Product Investigation

October 28, 2013

Core SDDA-18-AQ: 9 to 10 feet bml

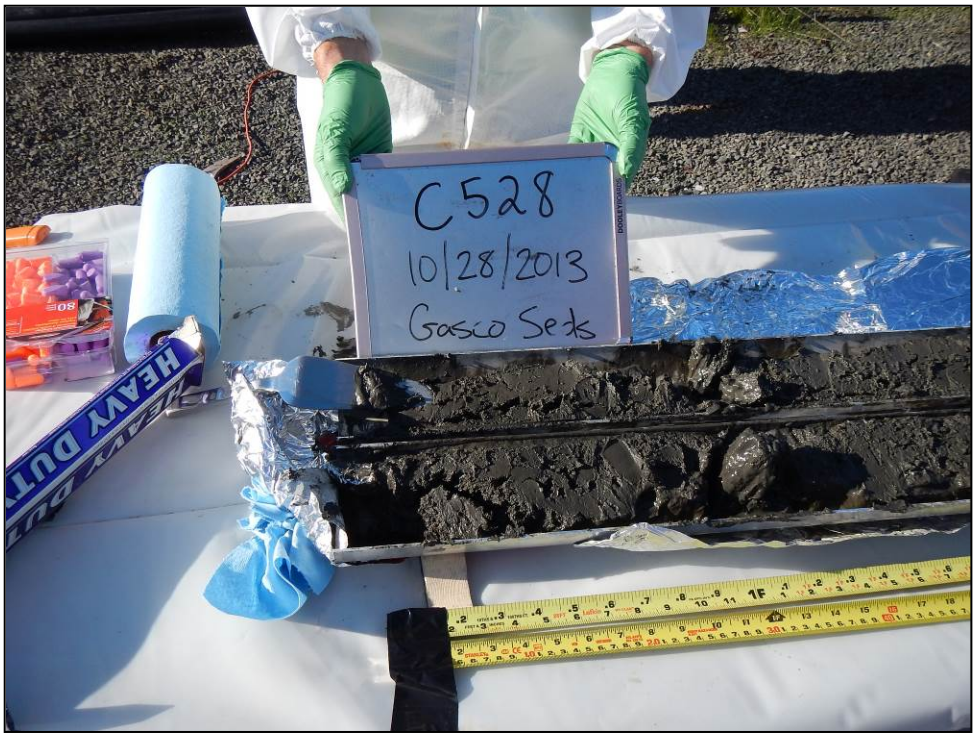


Core SDDA-18-AQ: 10 to 11 feet bml

FIELD PHOTOGRAPHY LOG SHEET
U.S. Moorings Substantial Product Investigation

October 28, 2013

Core SDDA-18-AQ: 11 to 12 feet bml



Core C528-AQ: 0 to 1 foot bml

FIELD PHOTOGRAPHY LOG SHEET
U.S. Moorings Substantial Product Investigation

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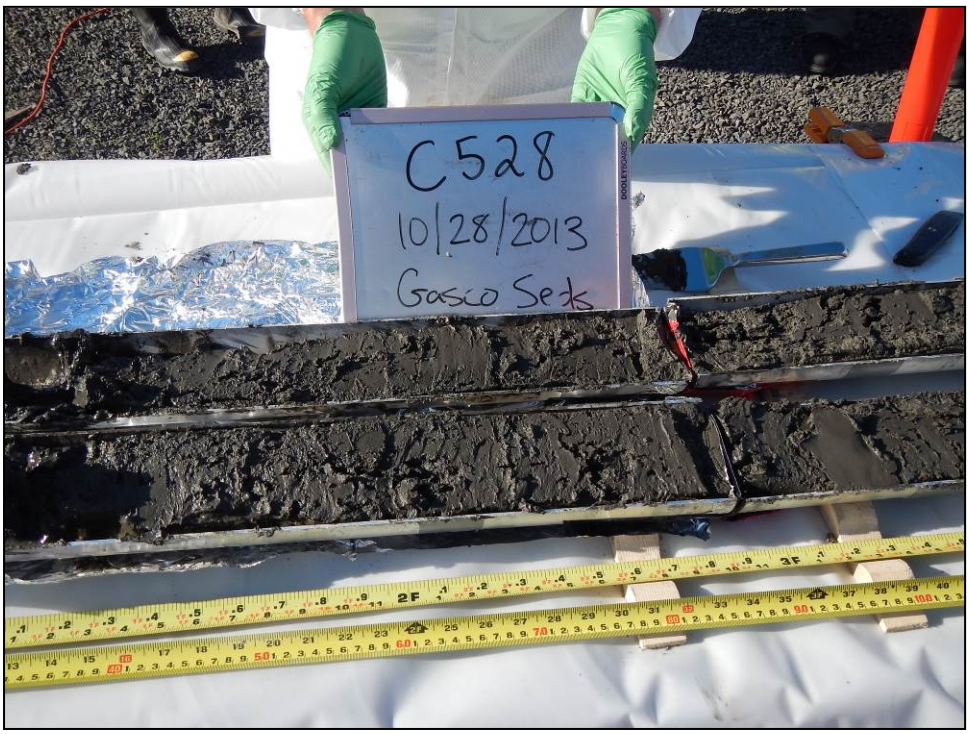

Core C528-AQ: 1.5 to 3 feet bml

Core C528-AQ: 3 to 5 feet bml

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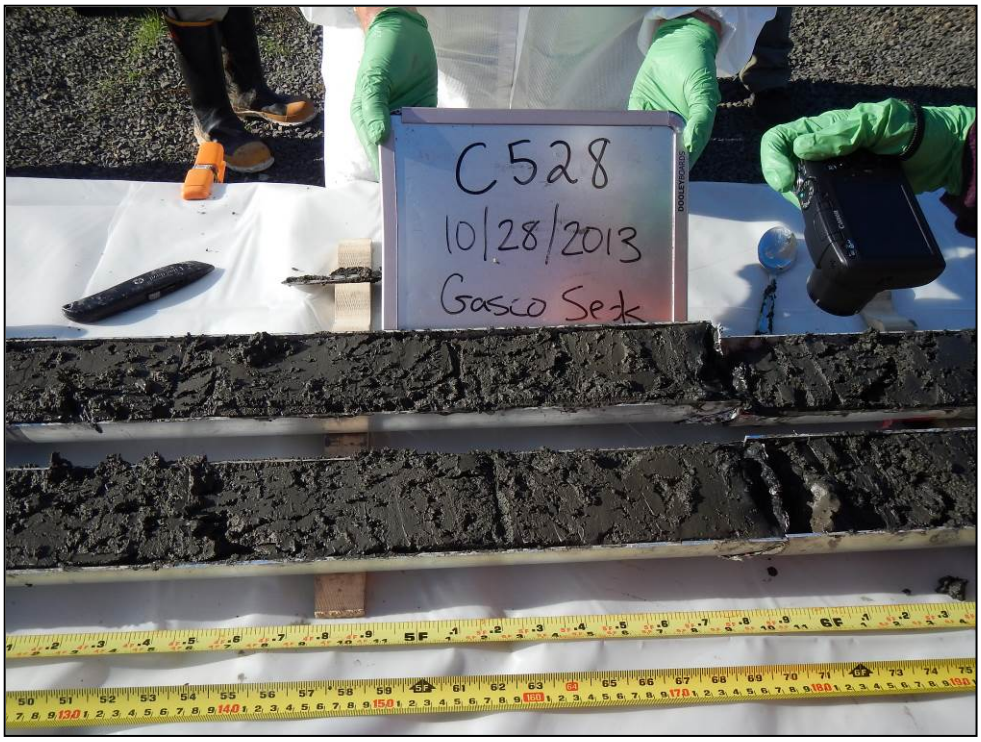
Core C528-AQ: 3 to 5 feet bml



Core C528-AQ: 4.5 to 6 feet bml

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Core C528-AQ: 5 to 6 feet bml

Core C528-AQ: 6 to 7.5 feet bml

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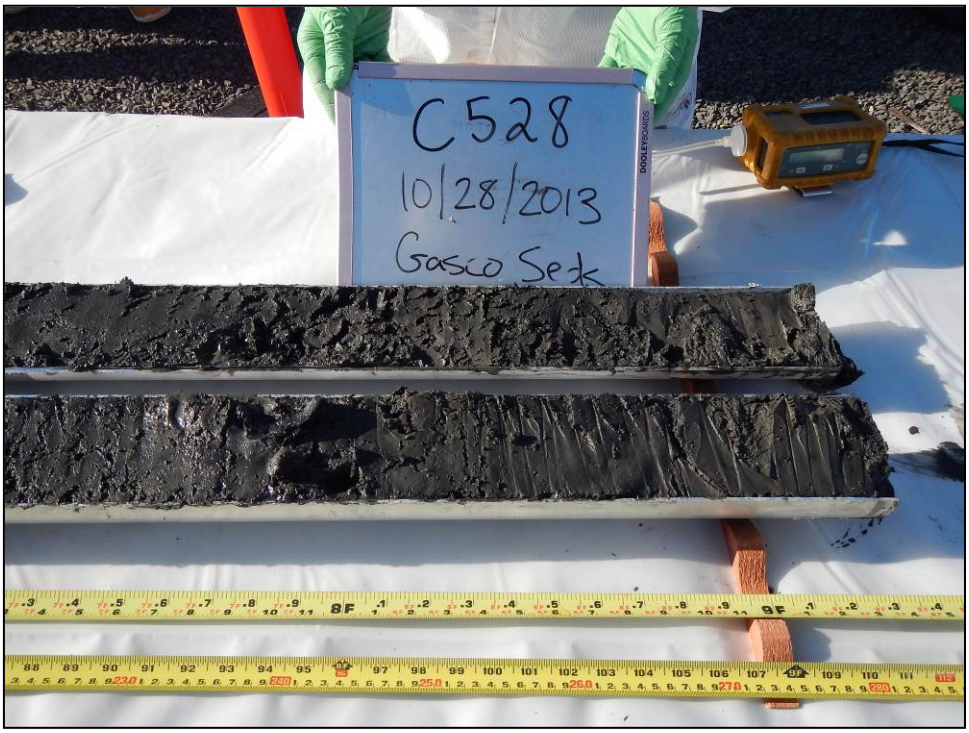

Core C528-AQ: 7.5 to 9.3 feet bml

Core C528-AQ: 8 to 9.3 feet bml

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Core 20-BF-AQ: 0 to 1 foot bml

Core 20-BF-AQ: 1 to 2 feet bml

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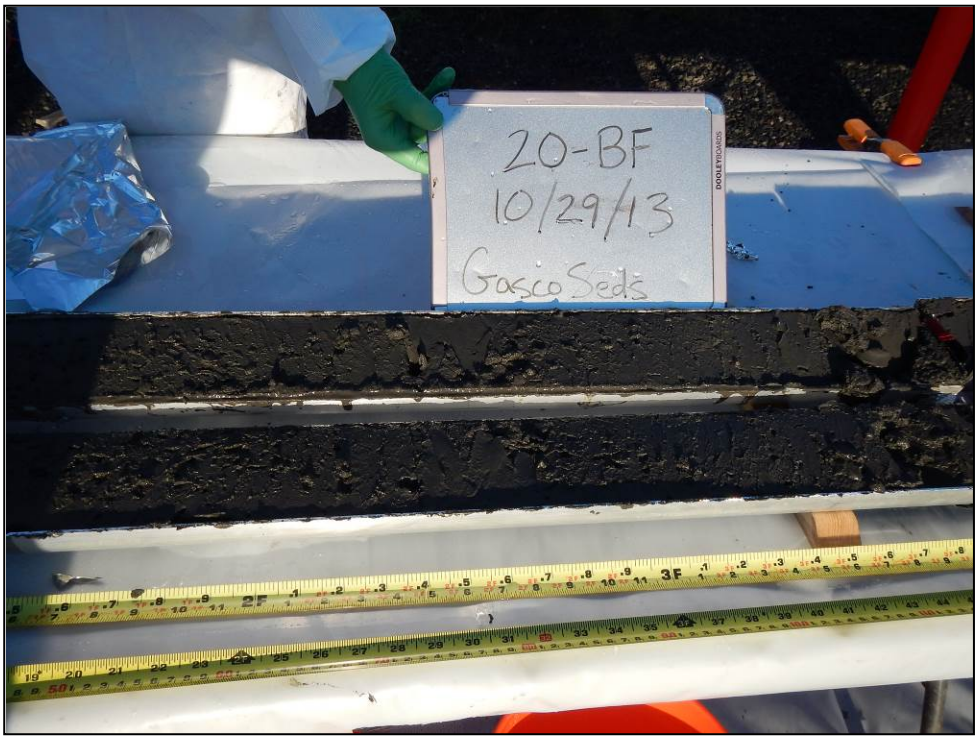
Core 20-BF-AQ: 1 to 2 feet bml



Core 20-BF-AQ: 2 to 3 feet bml

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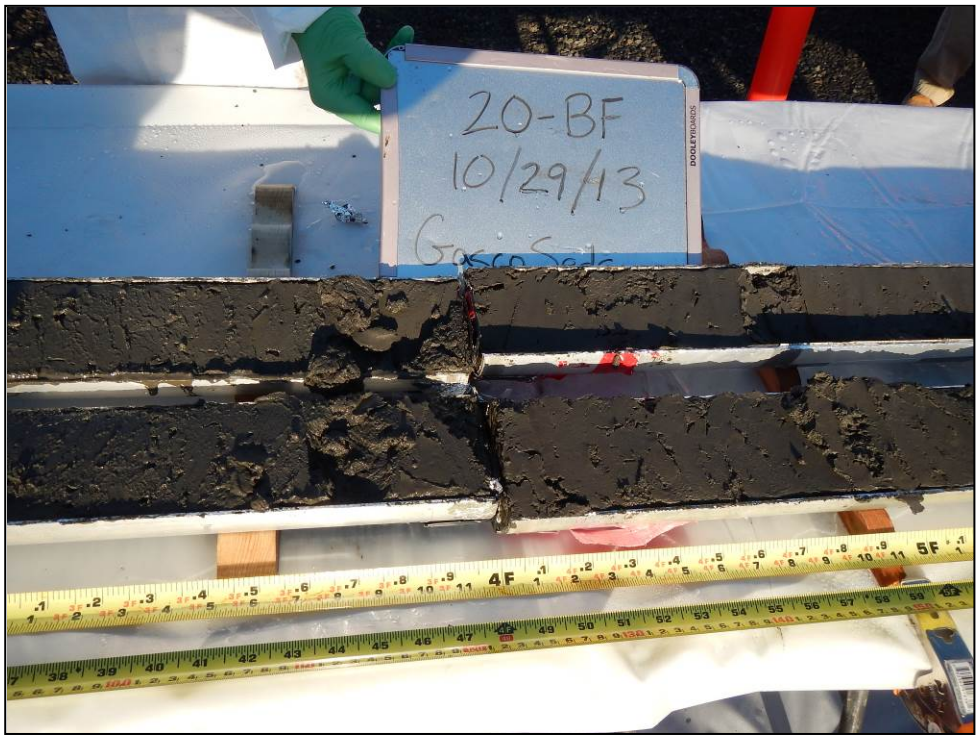
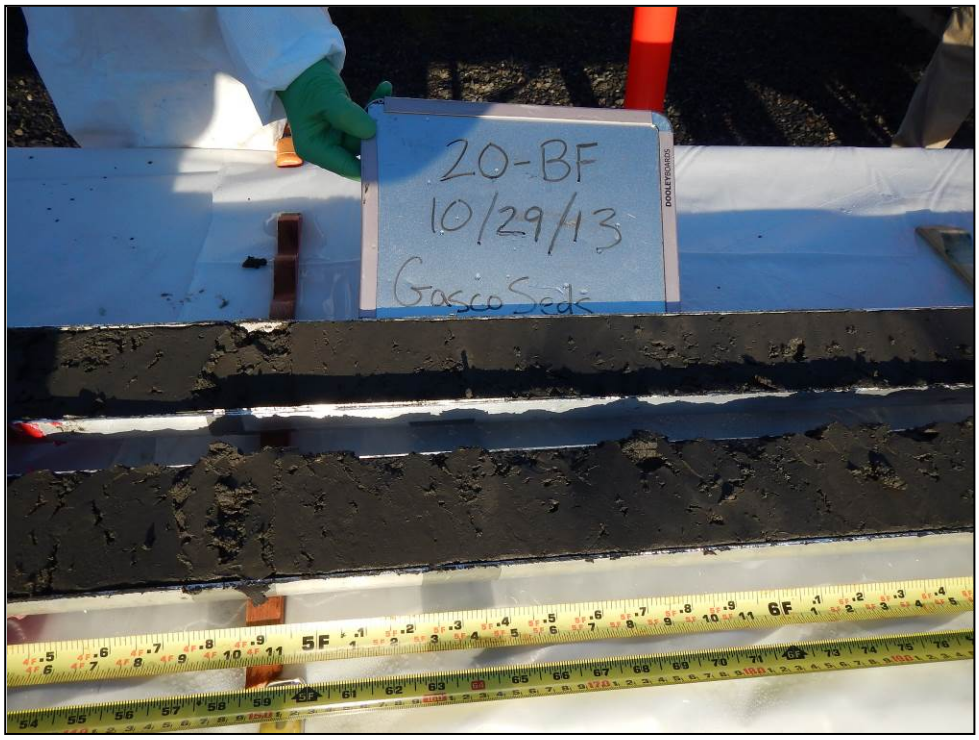


Core 20-BF-AQ: 4 to 5 feet bml



Core 20-BF-AQ: 5 to 6 feet bml

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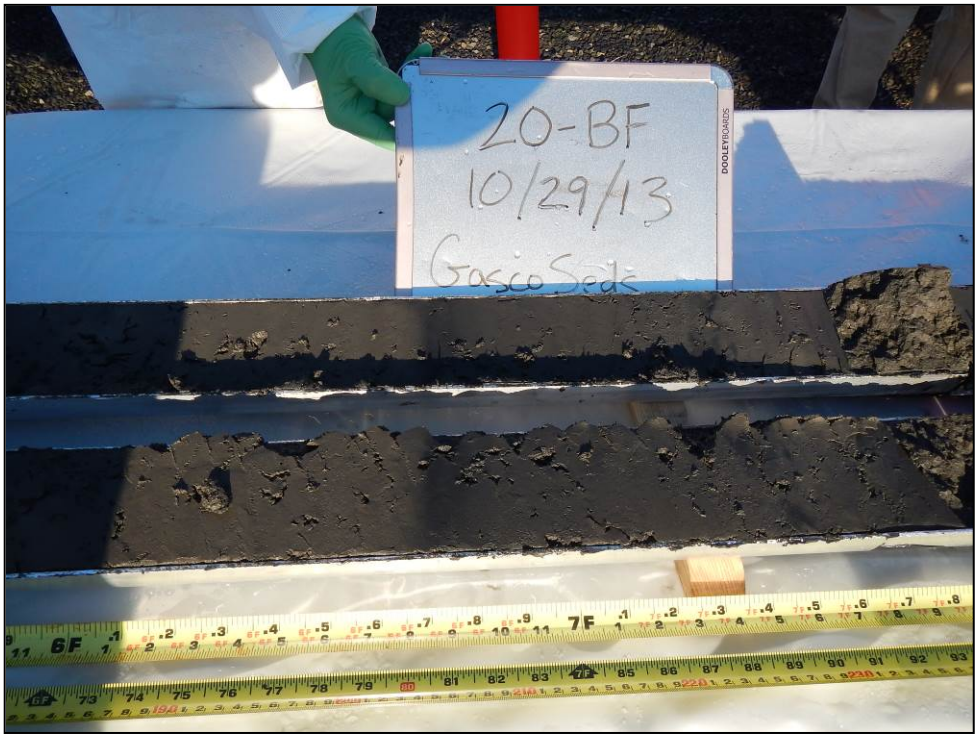
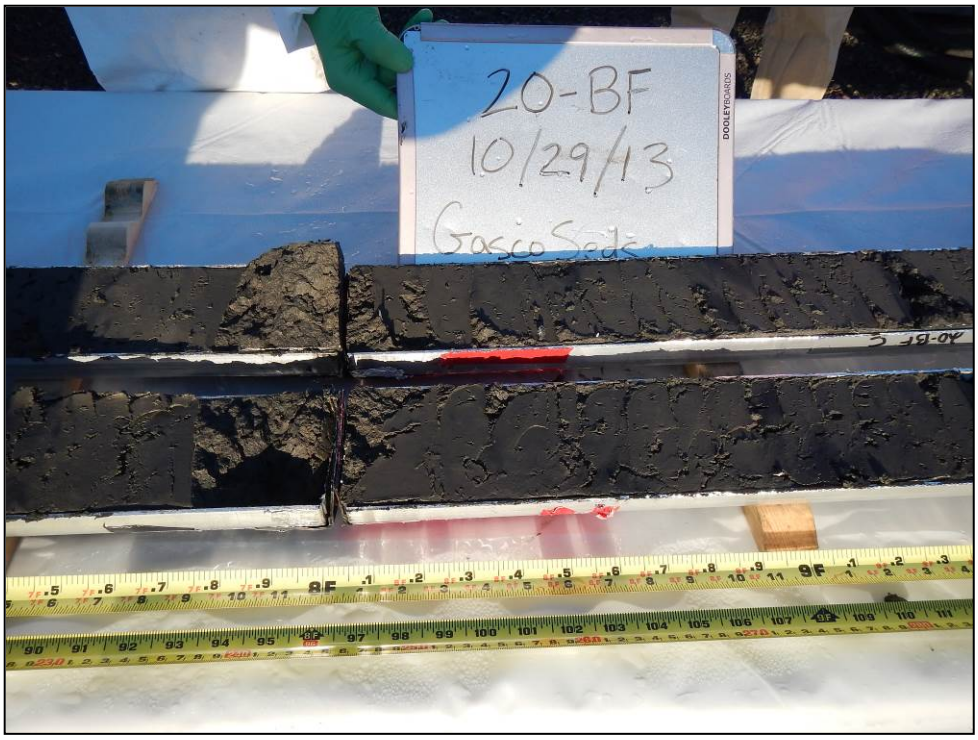


Core 20-BF-AQ: 6 to 7 feet bml



Core 20-BF-AQ: 8 to 9 feet bml

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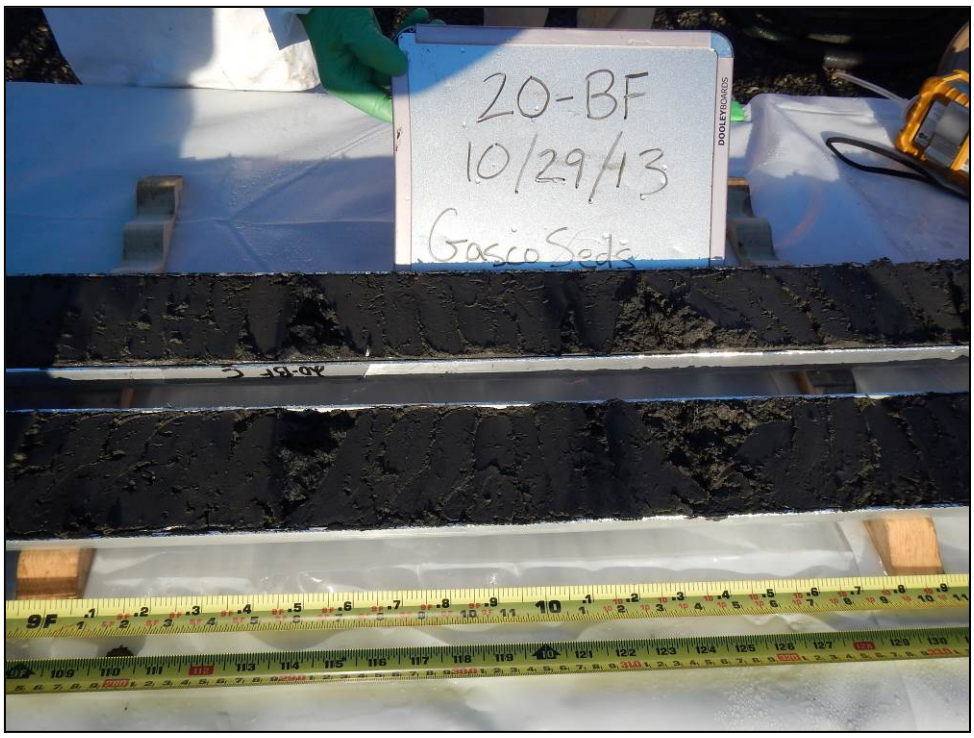
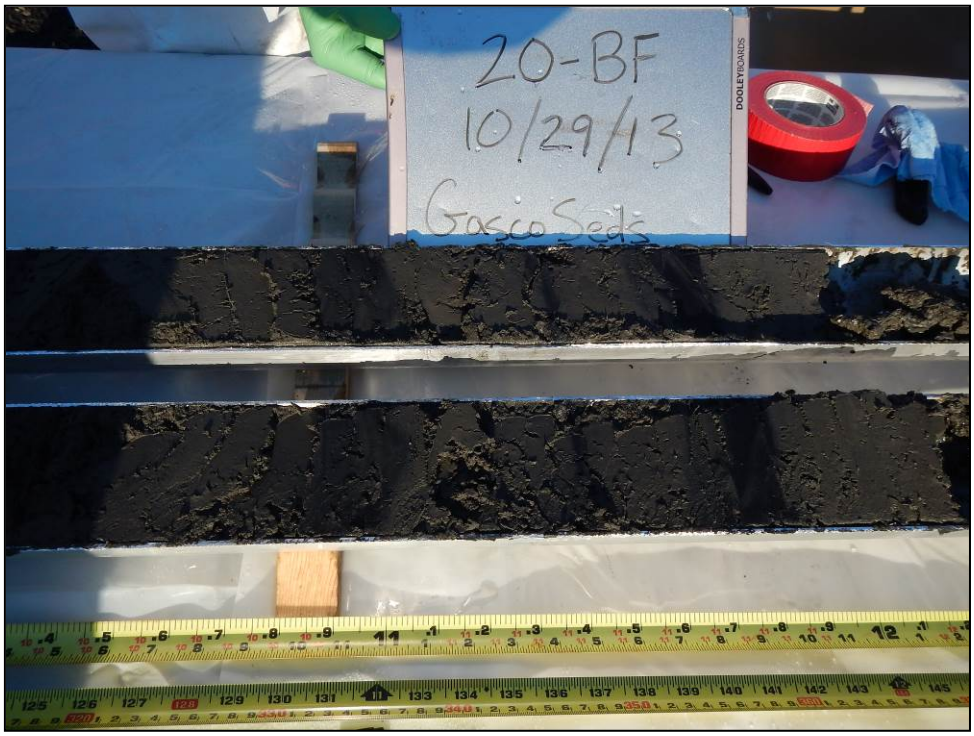


Core 20-BF-AQ: 9 to 10 feet bml



Core 20-BF-AQ: 11 to 12 feet bml

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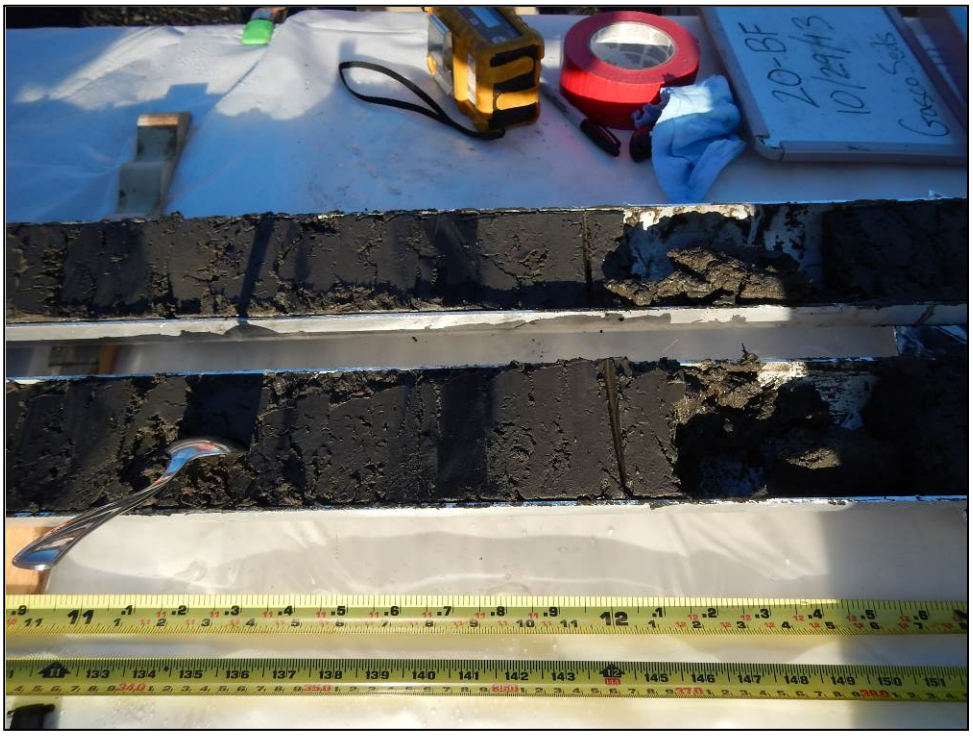
Core 20-BF-AQ: 12 to 13 feet bml



Core 20-BF-AQ: Black band at 11.7 feet bml

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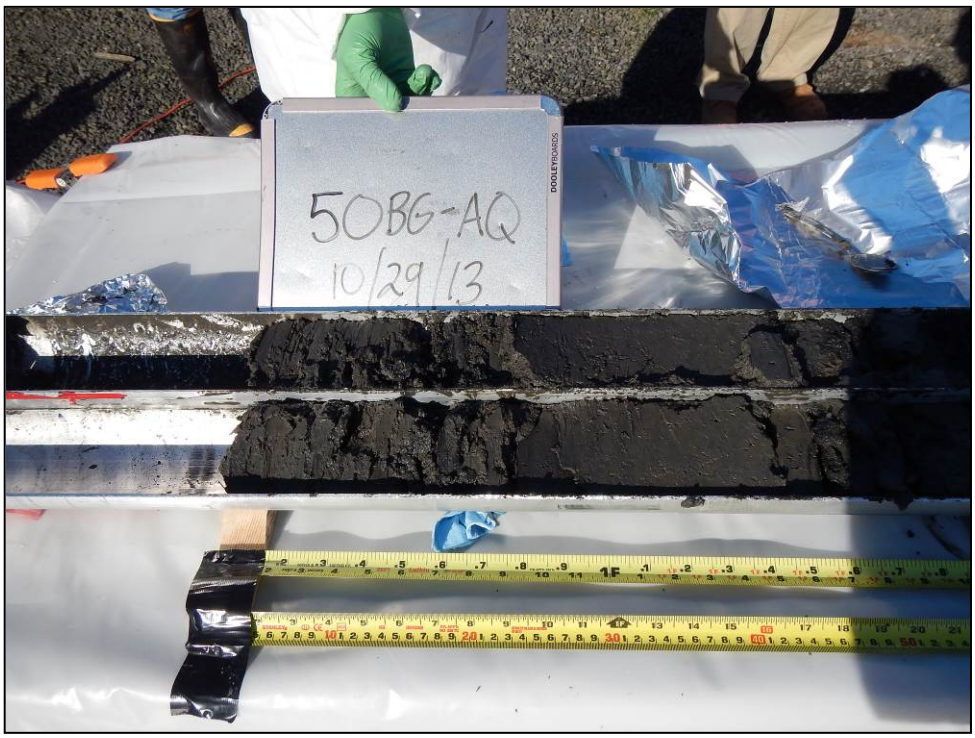
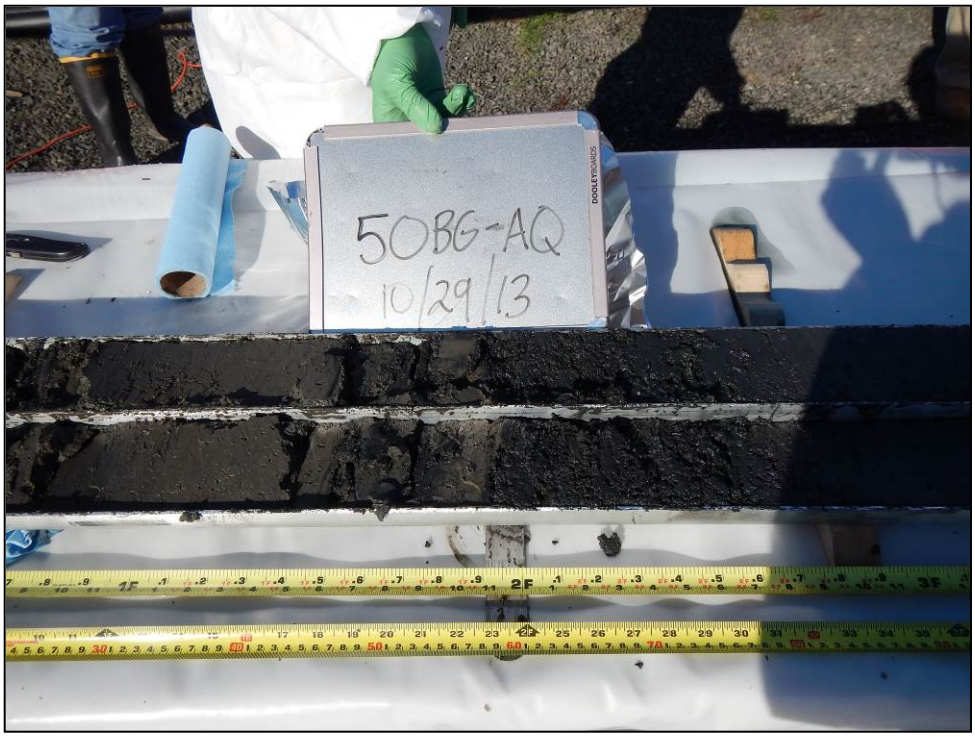


Core 50-BG-AQ: 0 to 1 foot bml



Core 50-BG-AQ: 1 to 2 feet bml

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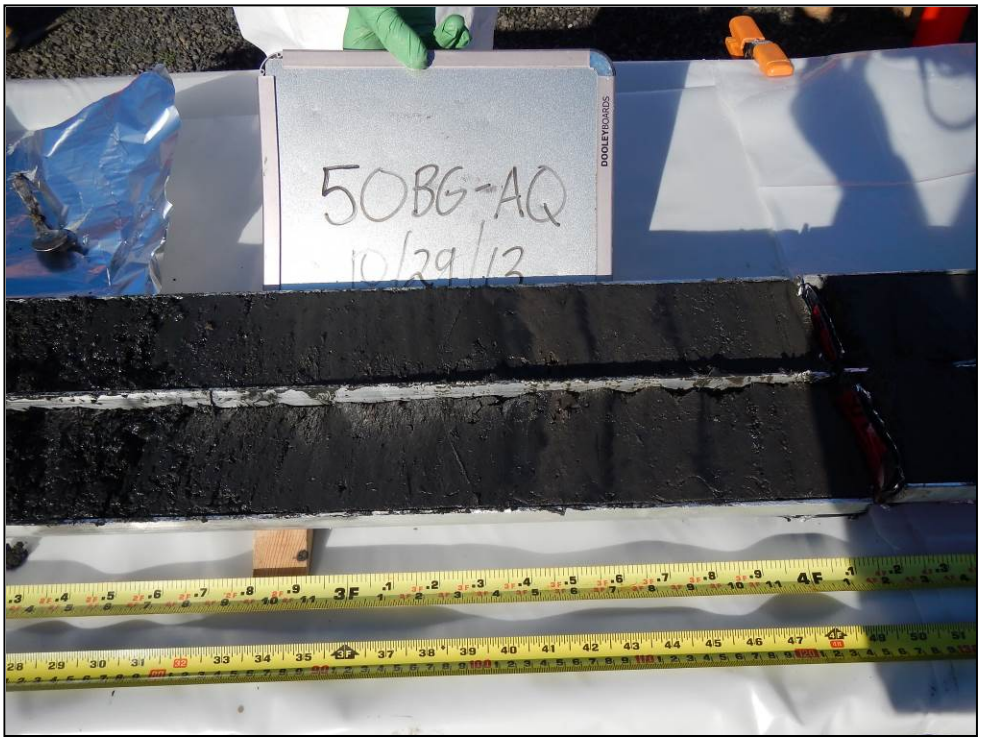

Core 50-BG-AQ: 3 to 4 feet bml

Core 50-BG-AQ: 5 feet bml

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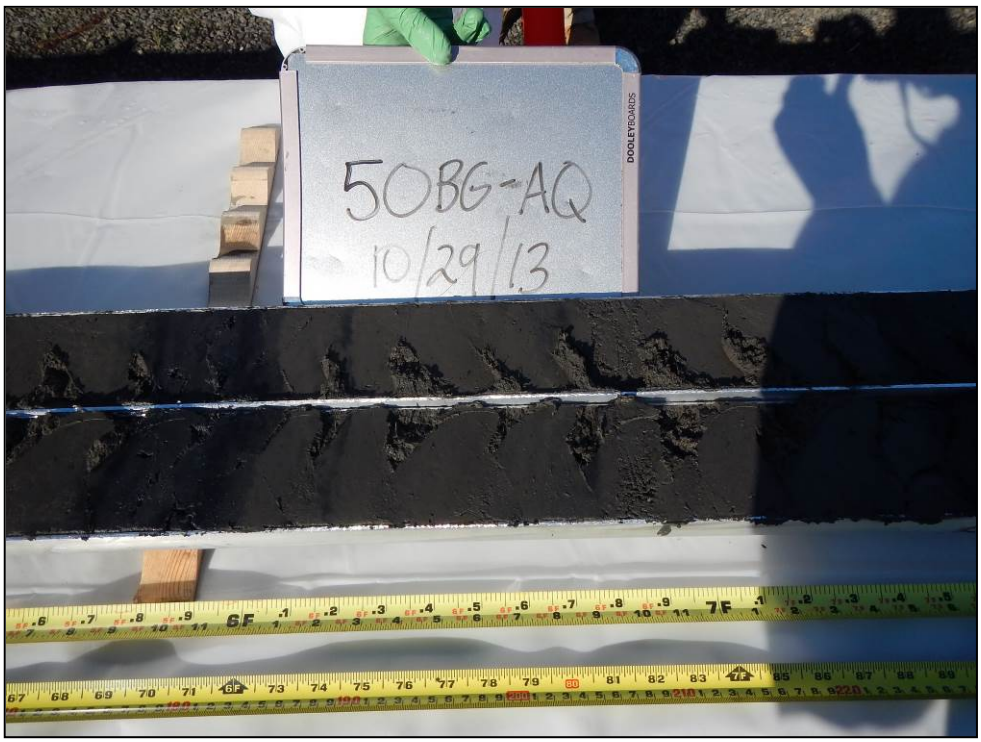
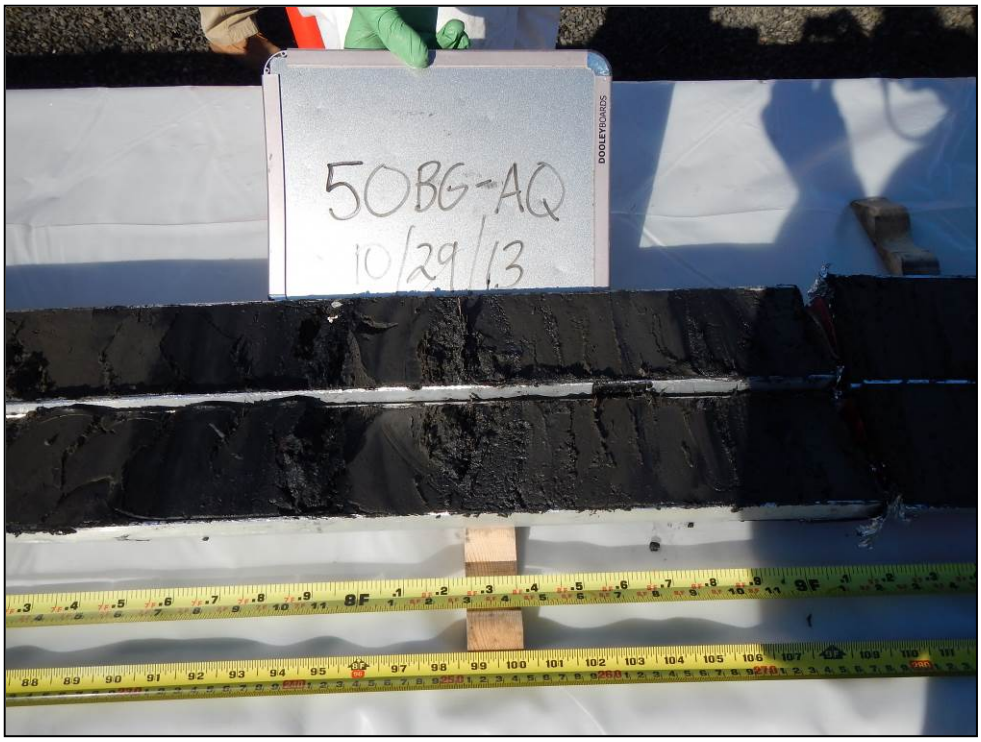


Core 50-BG-AQ: 6 to 7 feet bml



Core 50-BG-AQ: 8 feet bml

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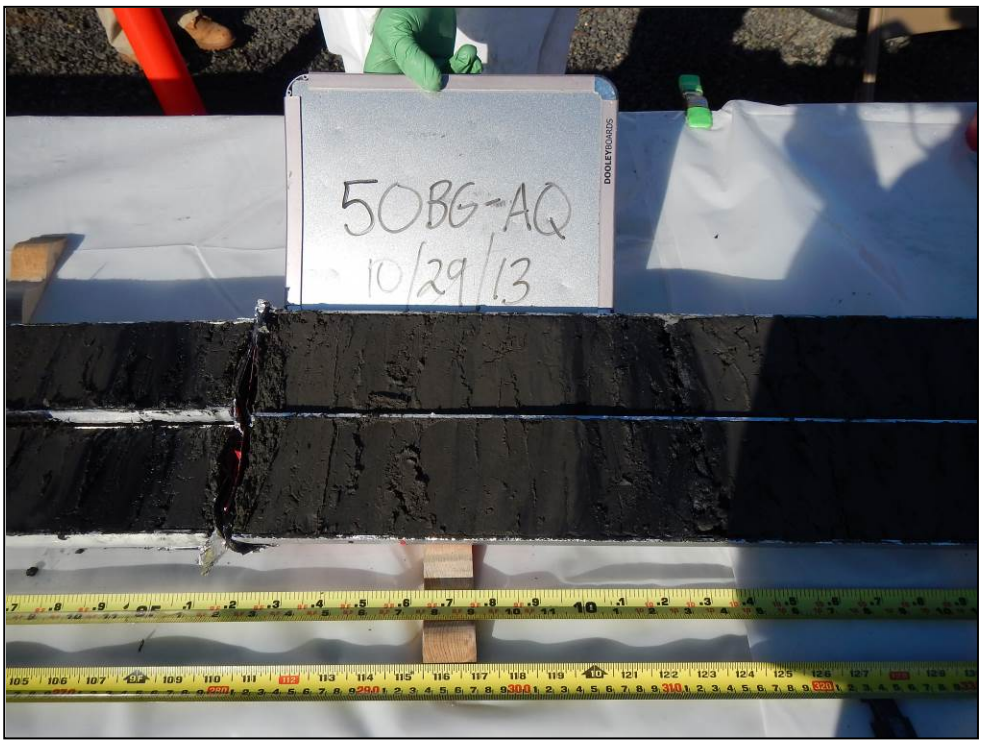
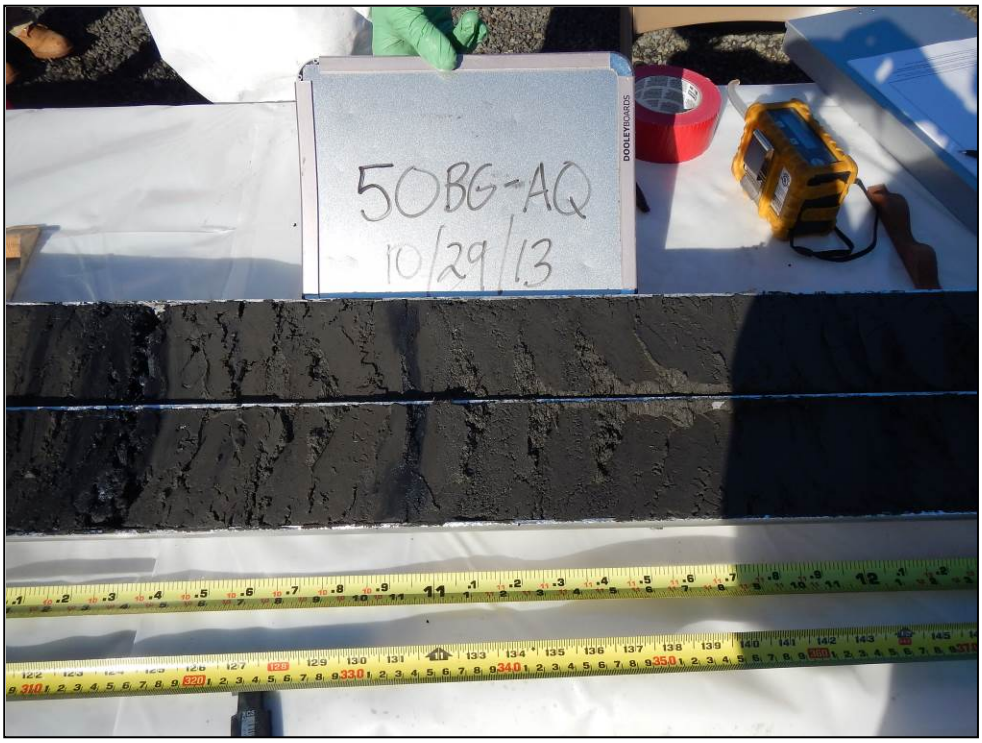


Core 50-BG-AQ: 9 to 10 feet bml



Core 50-BG-AQ: 11 feet bml

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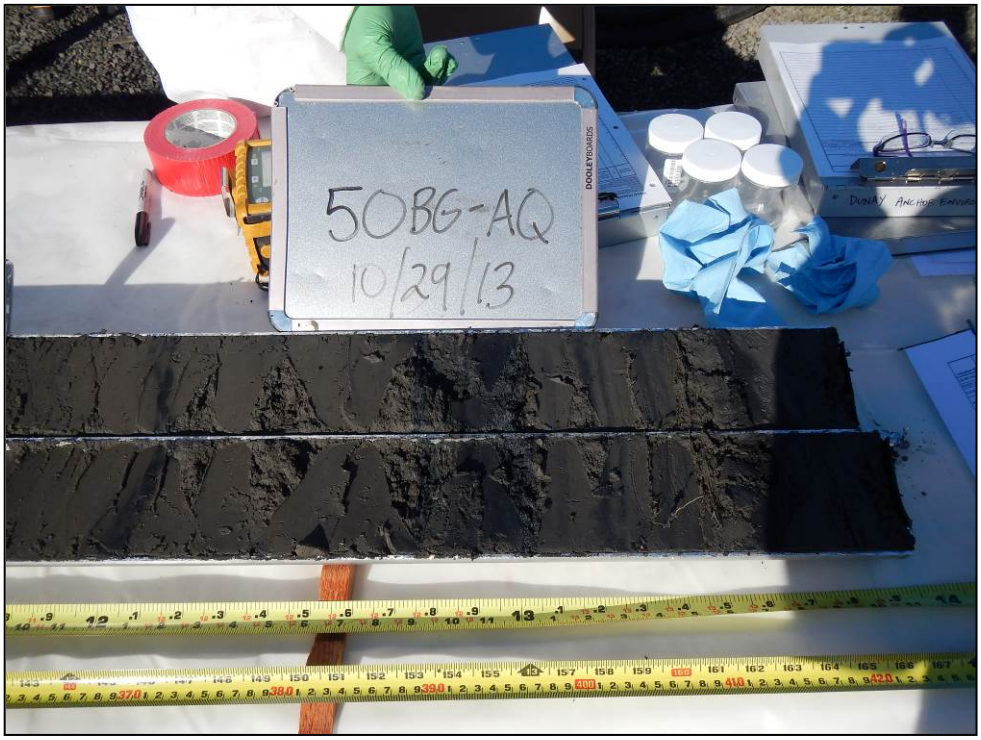
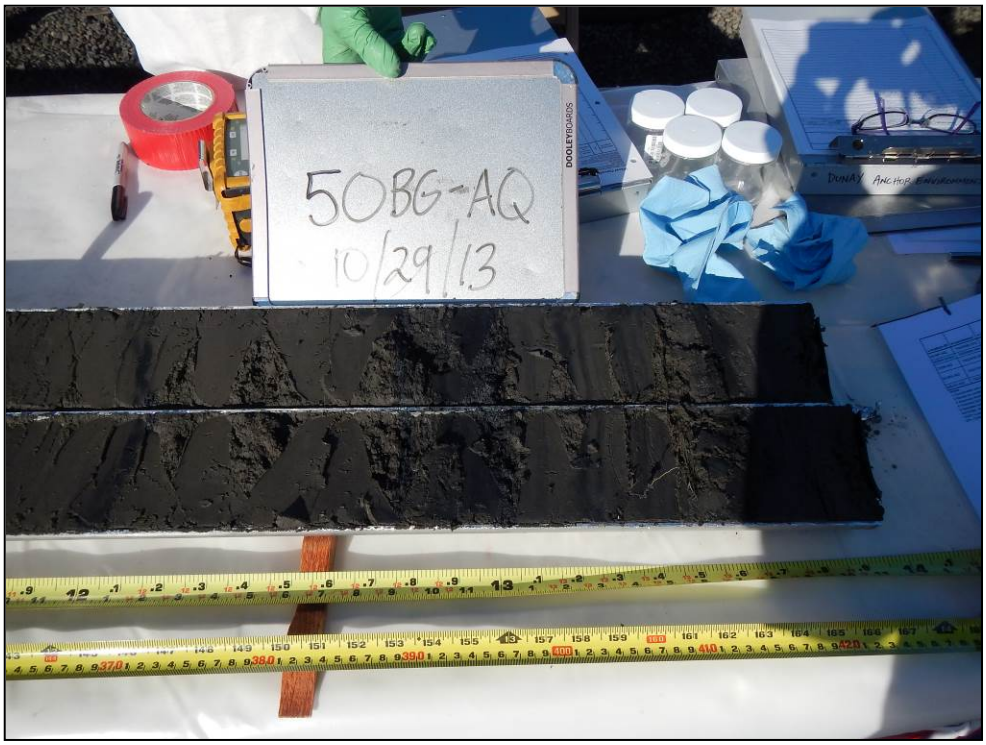


Core 50-BG-AQ: 12 to 13 feet bml



Core 50-BG-AQ: 13 feet bml

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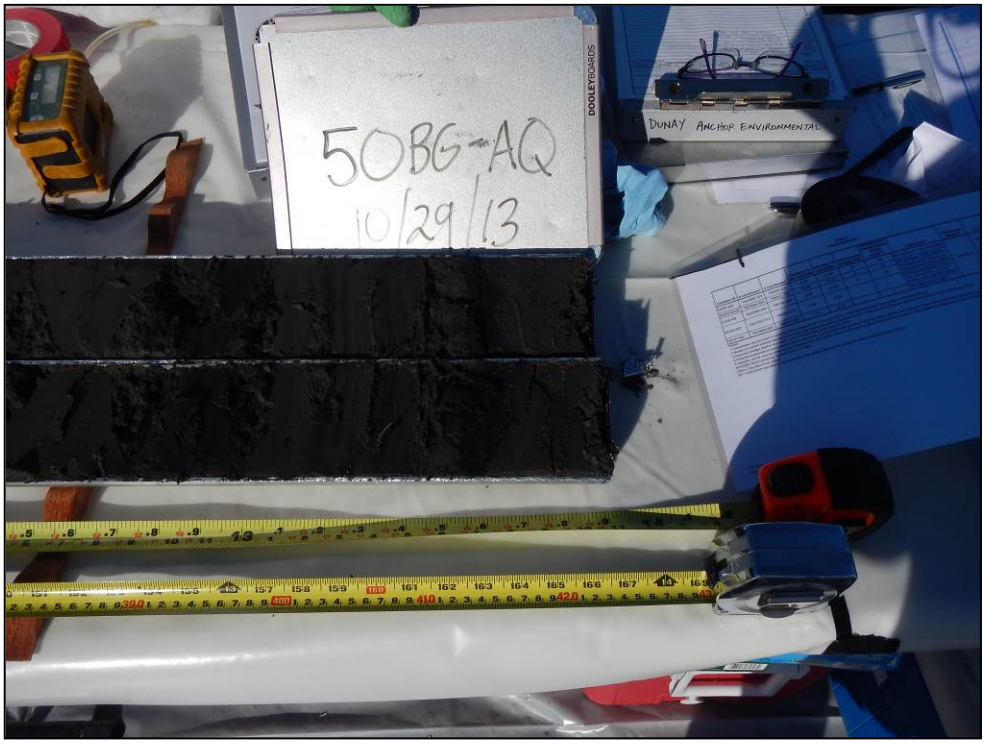

Core 50-BG-AQ: 13 feet bml

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Core SD-101: 0 to 1 foot bml

Core SD-101: 1 to 2 feet bml

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Core SD-101: 4 to 5 feet bml

Core SD-101: 5 to 6 feet bml

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Core SD-101: 7 to 8 feet bml

Core 20-BF-AQ: 9 to 10 feet bml

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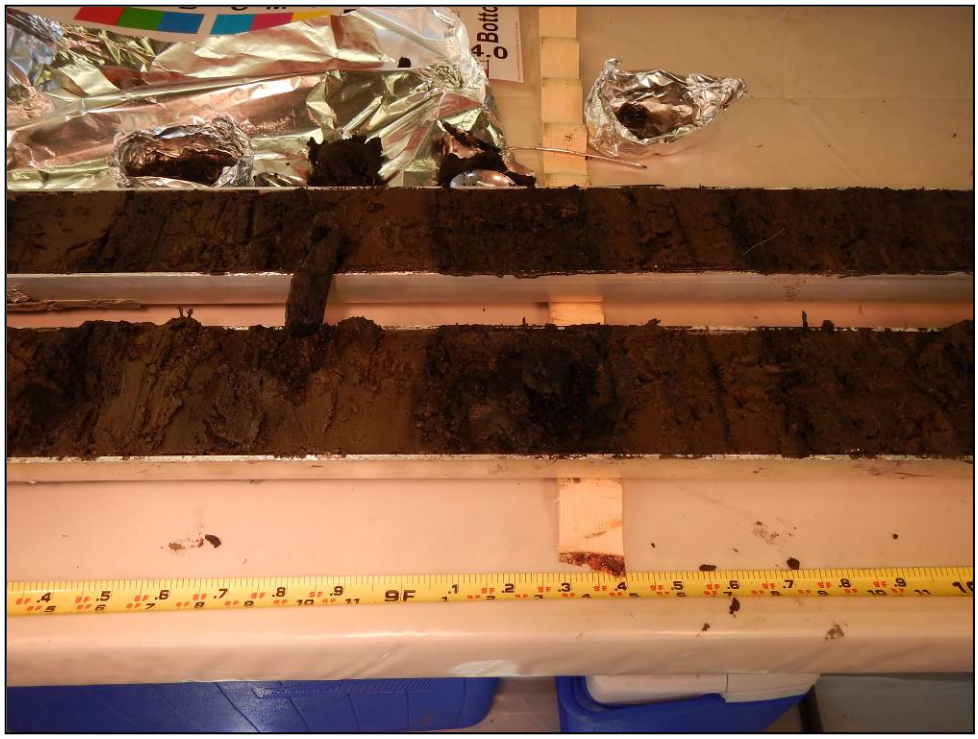
Core SD-101: 10 to 11.1 feet bml



Core SD-101: Black layer at 9.05 to 9.4 feet bml

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Core SD-102: 0 to 1 foot bml

Core SD-102: 1 to 2 feet bml

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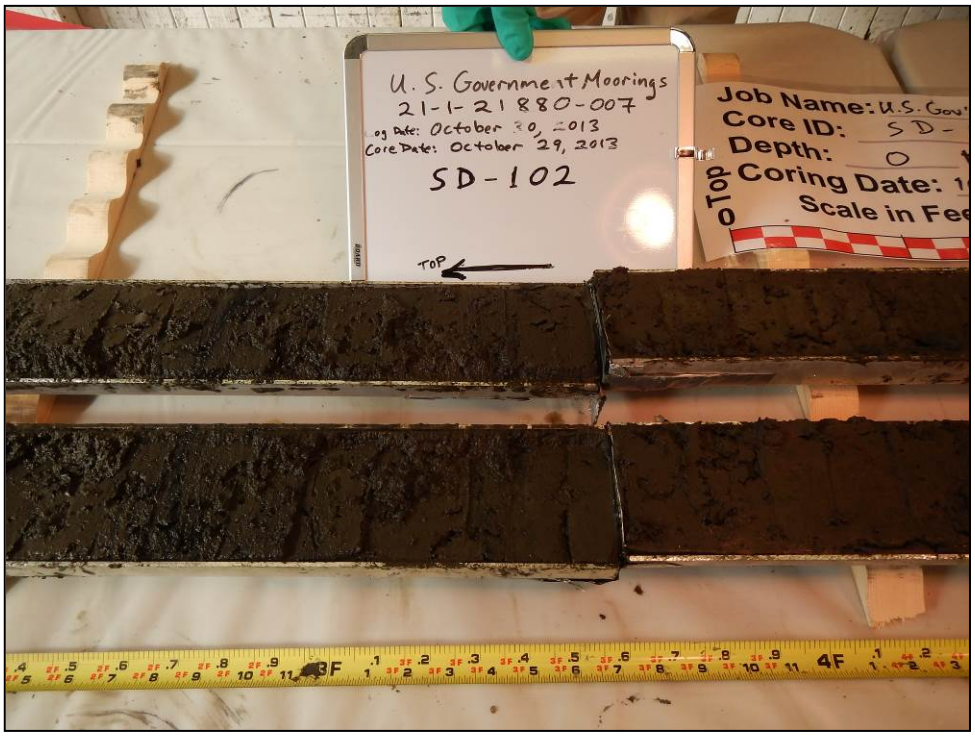

Core SD-102: 3 to 4 feet bml

Core SD-102: 4 to 5 feet bml

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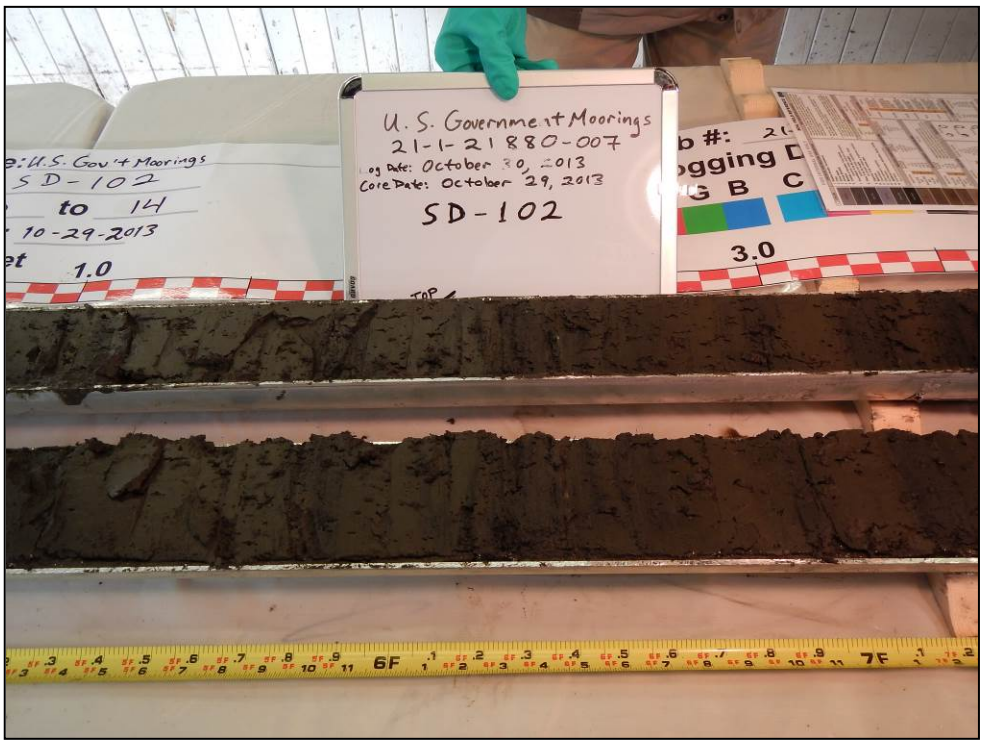
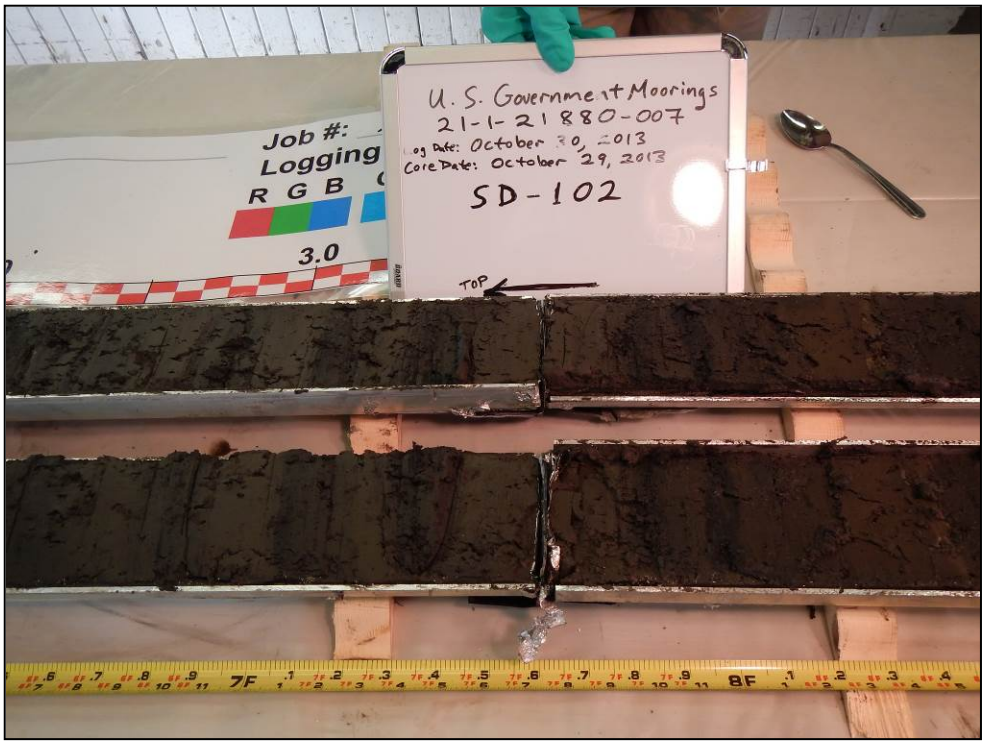


Core SD-102: 6 to 7 feet bml



Core SD-102: 7 to 8 feet bml

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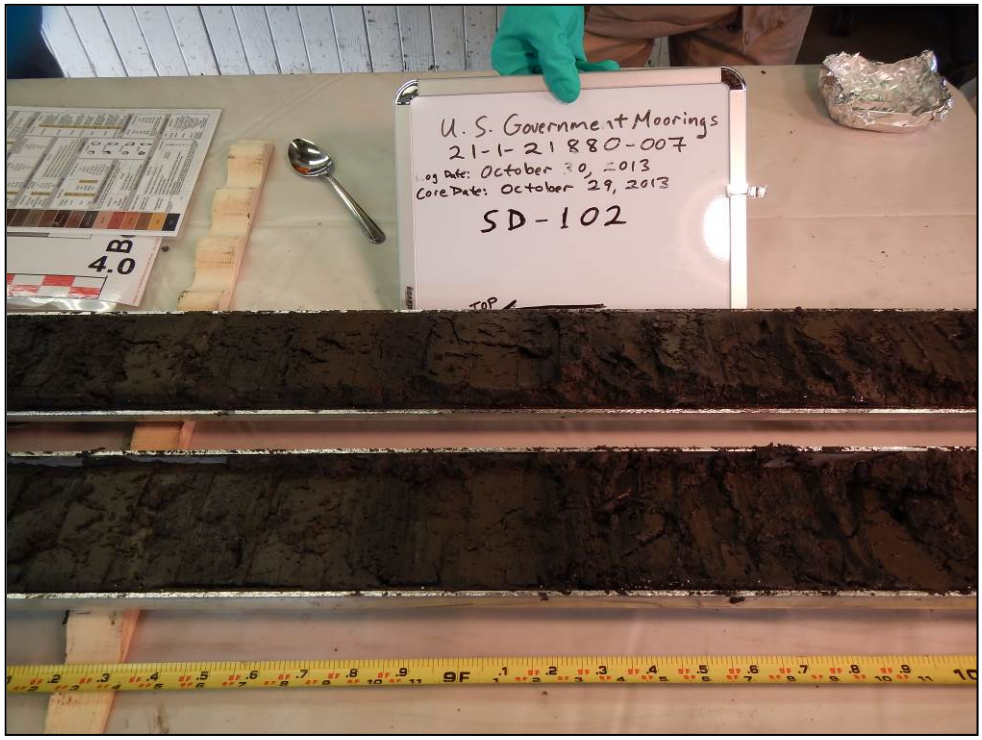
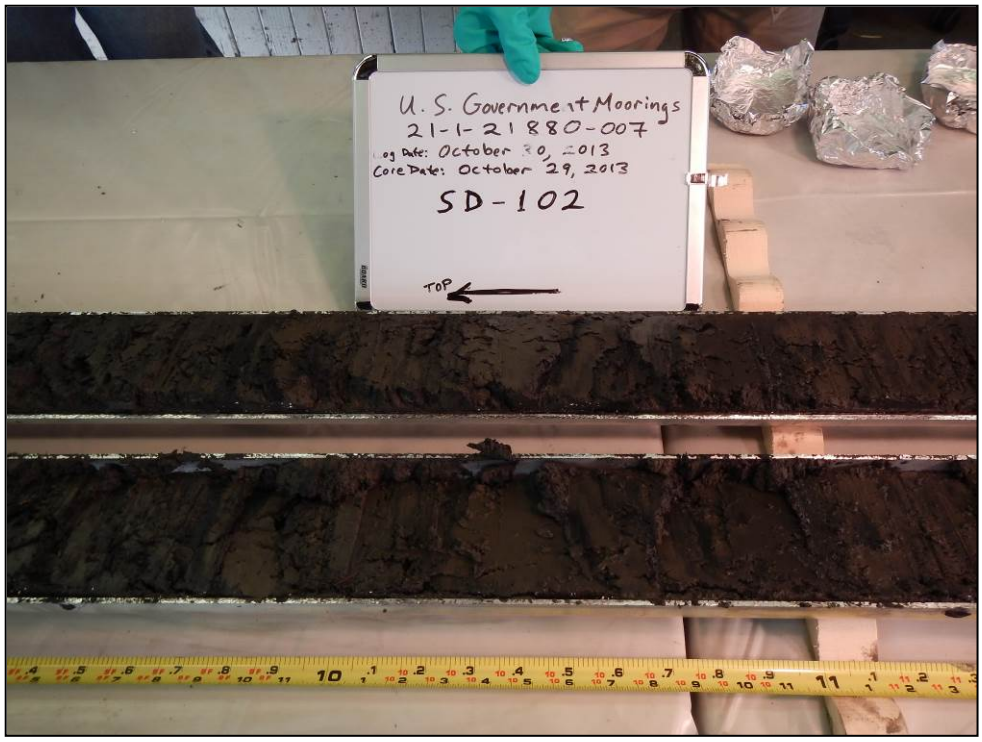


Core SD-102: 9 feet bml



Core SD-102: 10 to 11 feet bml

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Core SD-102: 11 to 12.1 feet bml

Core SD-106: 0 to 1 foot bml

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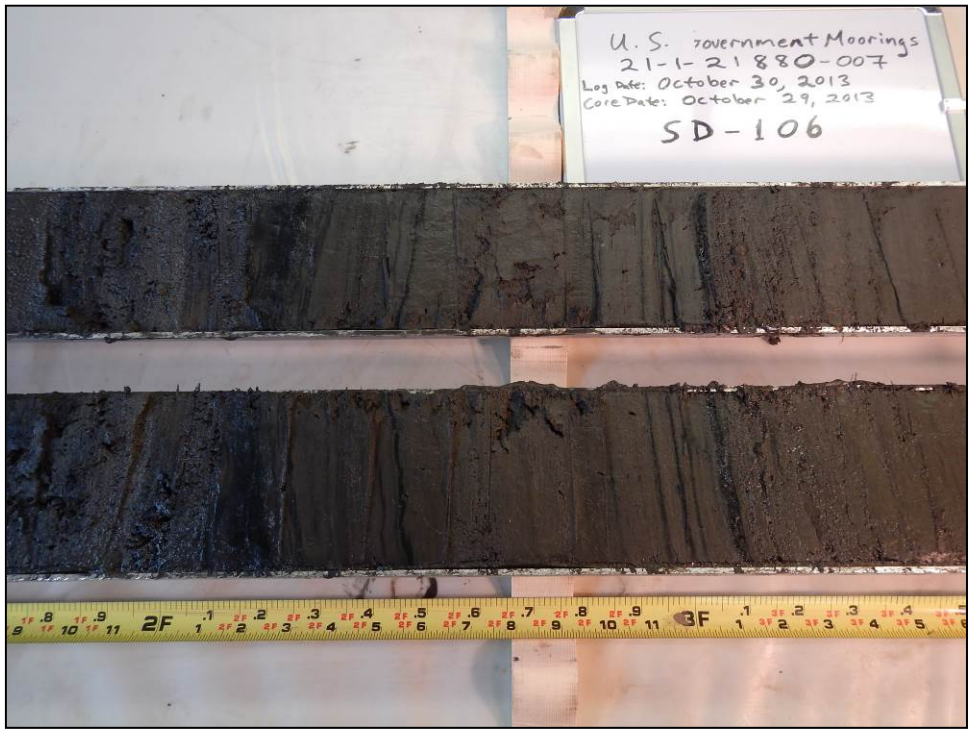
Core SD-106: 1 to 2 feet bml



Core SD-106: 2 to 3 feet bml

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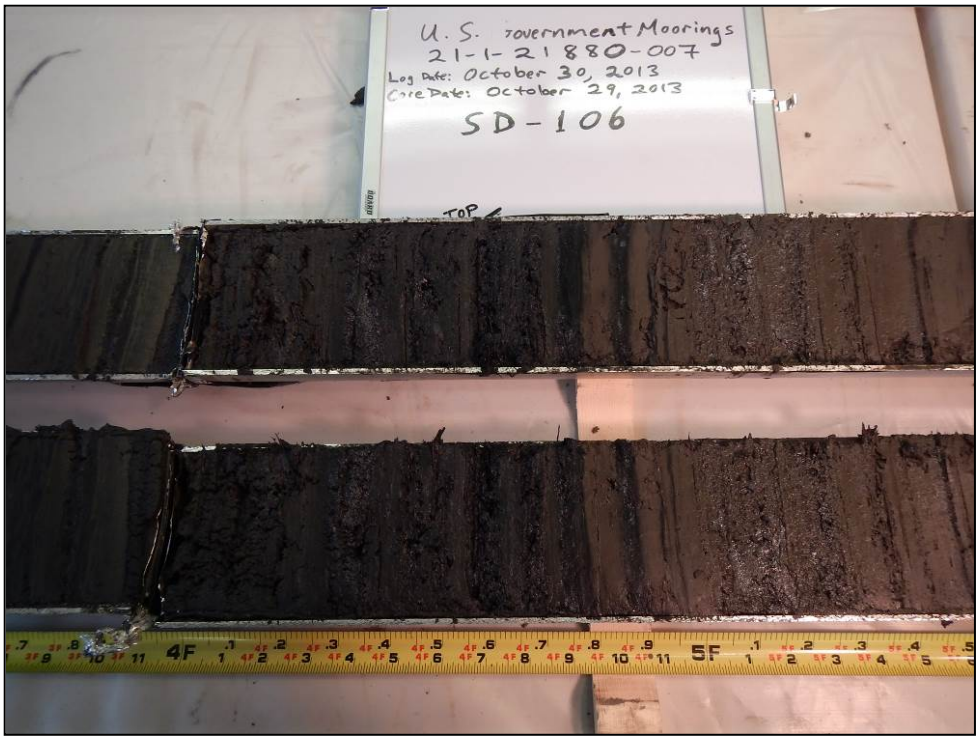
Core SD-106: 3 to 4 feet bml



Core SD-106: 4 to 5 feet bml

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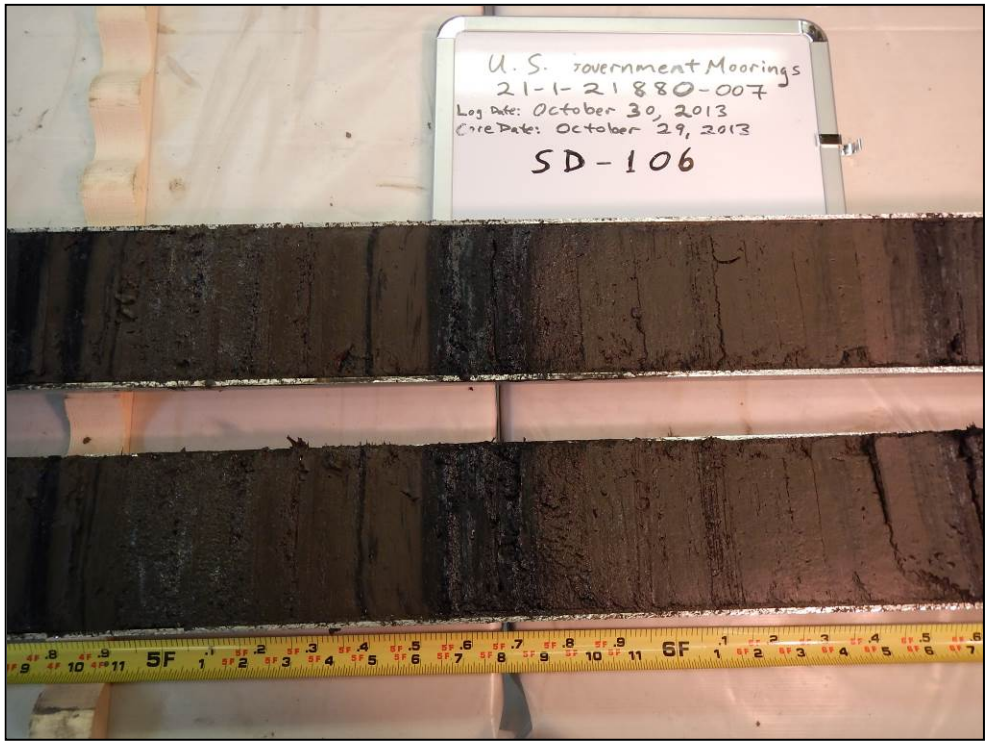
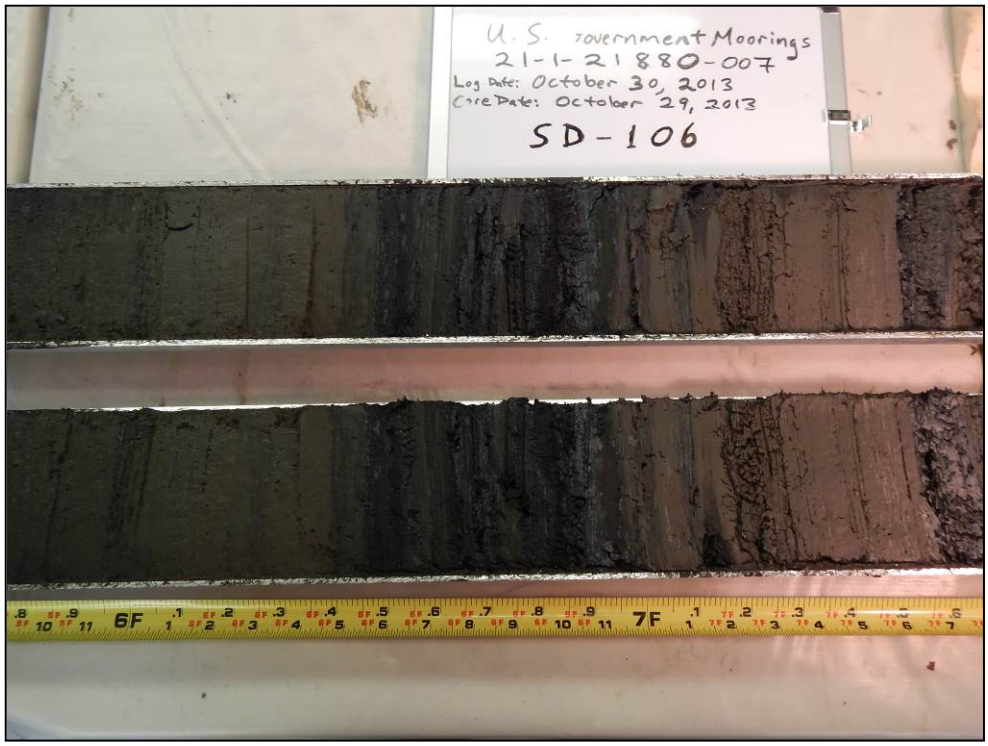


Core SD-106: 5 to 6 feet bml



Core SD-106: 6 to 7 feet bml

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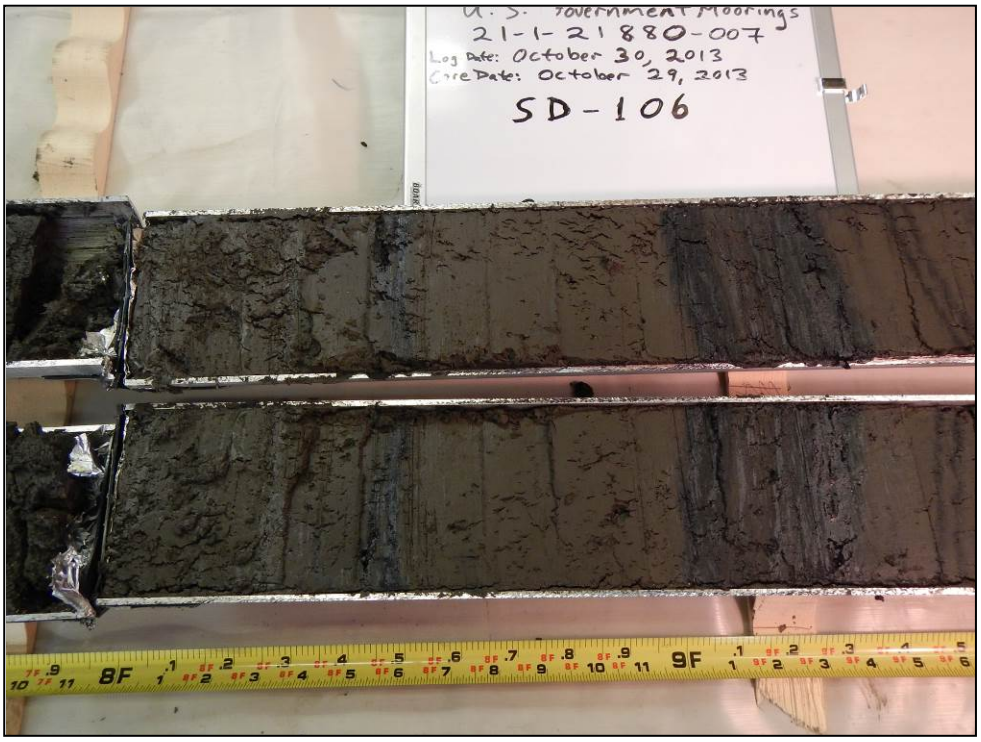
Core SD-106: 7 to 8 feet bml



Core SD-106: 8 to 9 feet bml

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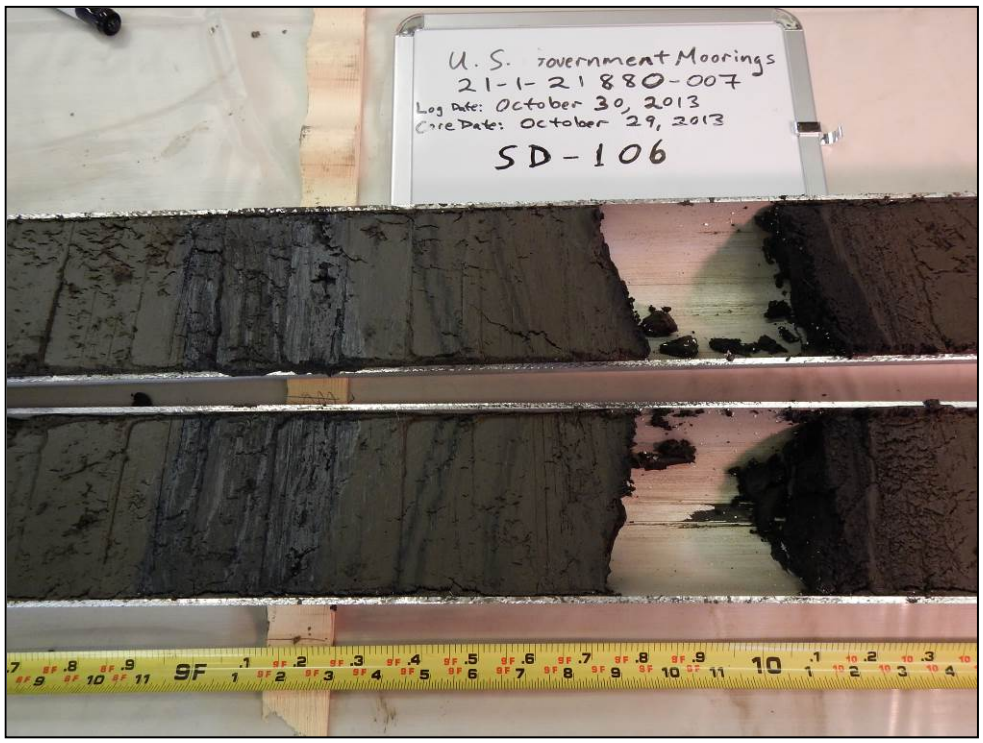
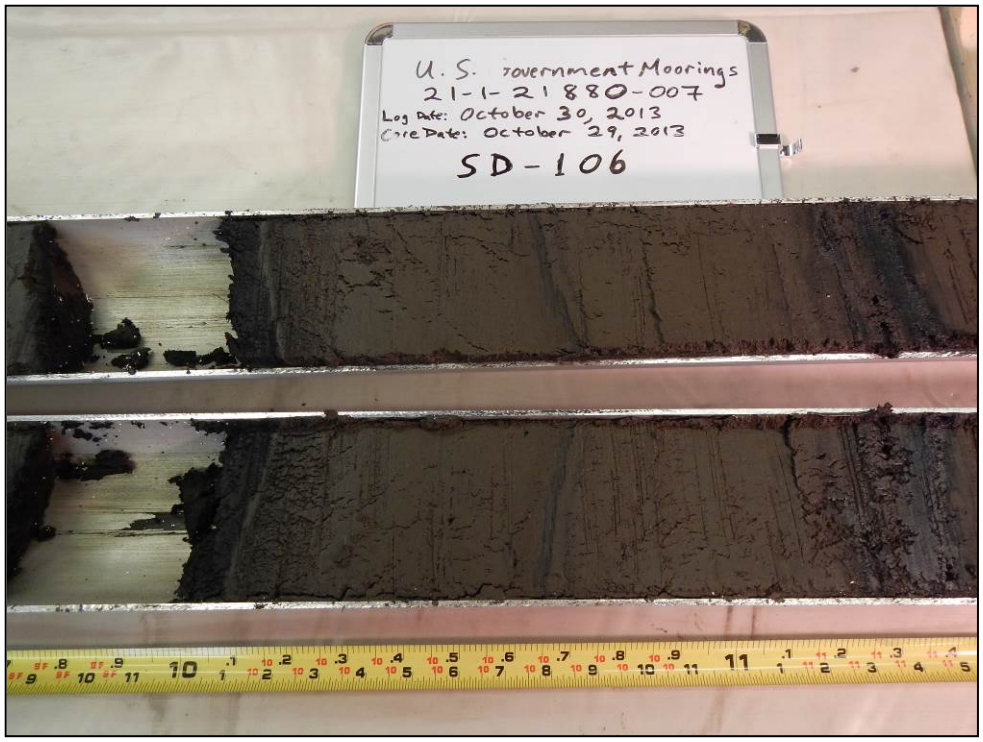


Core SD-106: 9 to 10 feet bml



Core SD-106: 10 to 11 feet bml

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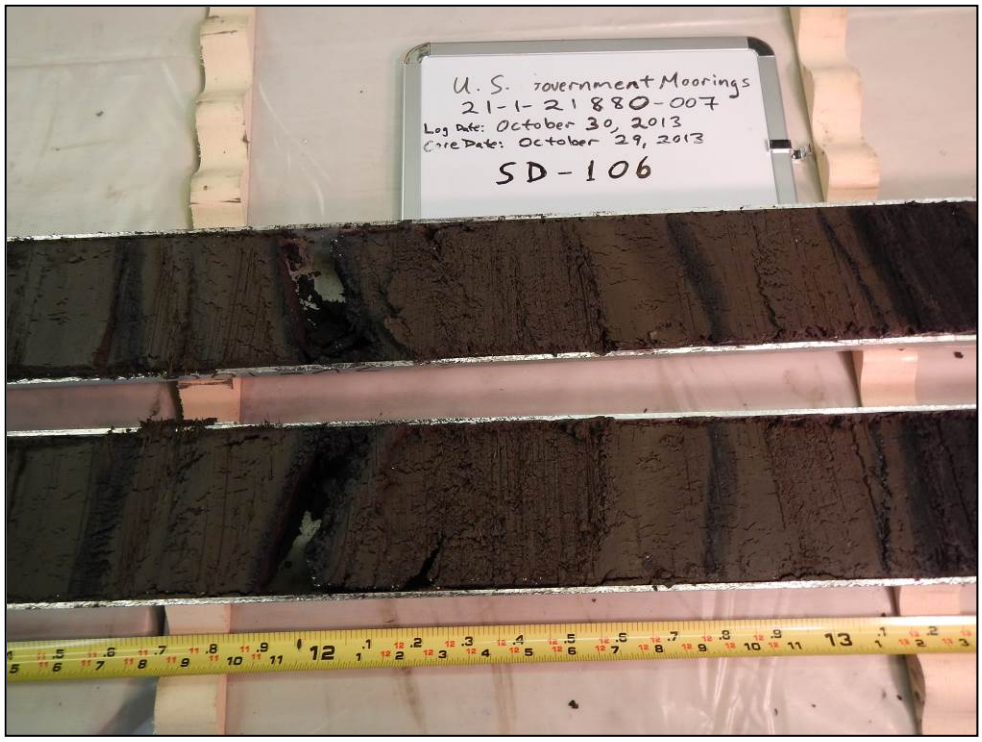
Core SD-106: 11 to 12 feet bml



Core SD-106: 12 to 13 feet bml

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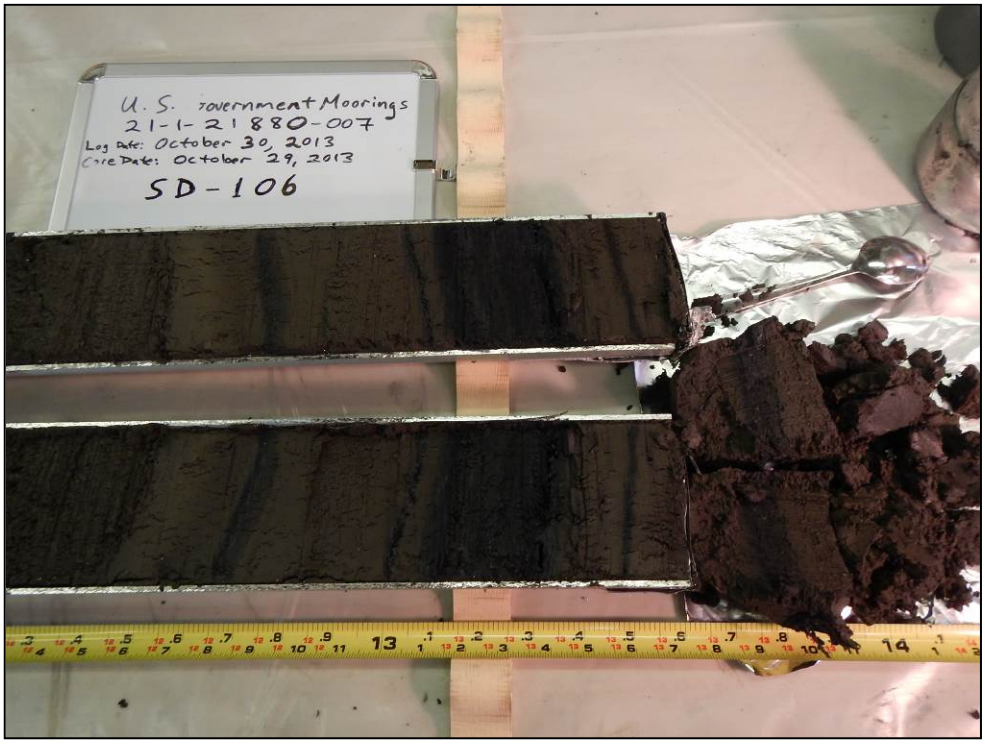
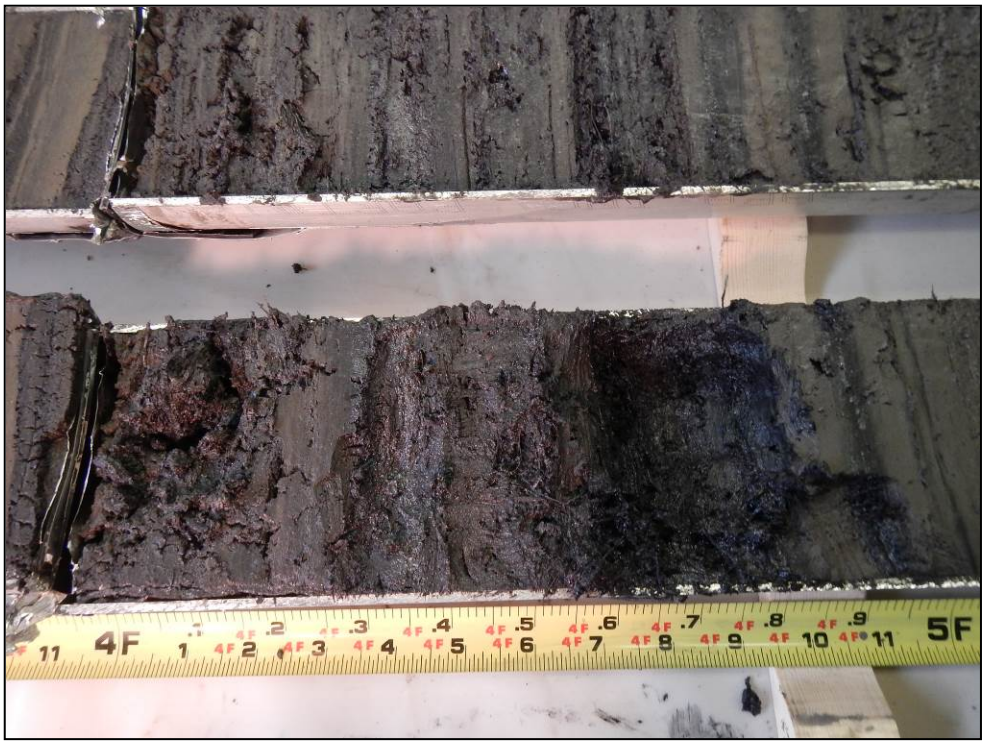


Core SD-106: 13 feet bml



Core SD-106: Black layer at 4.58 feet bml

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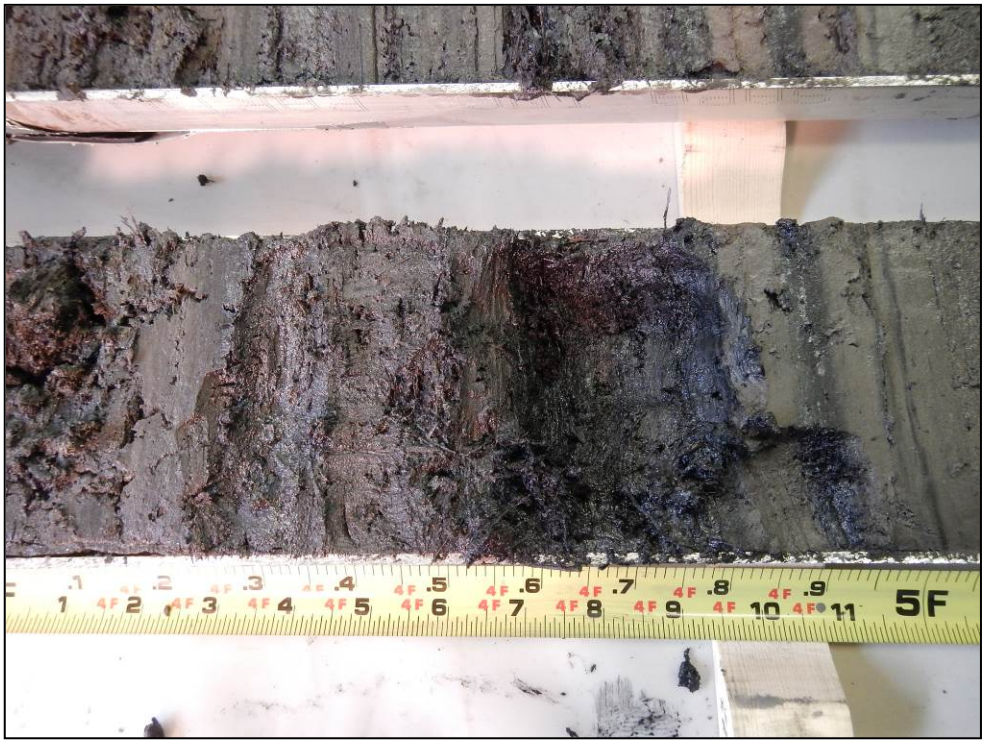

Core SD-106: Black layer at 4.58 feet bml

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Core SD-103: 0 to 1 foot bml

Core SD-103: 1 to 2 feet bml

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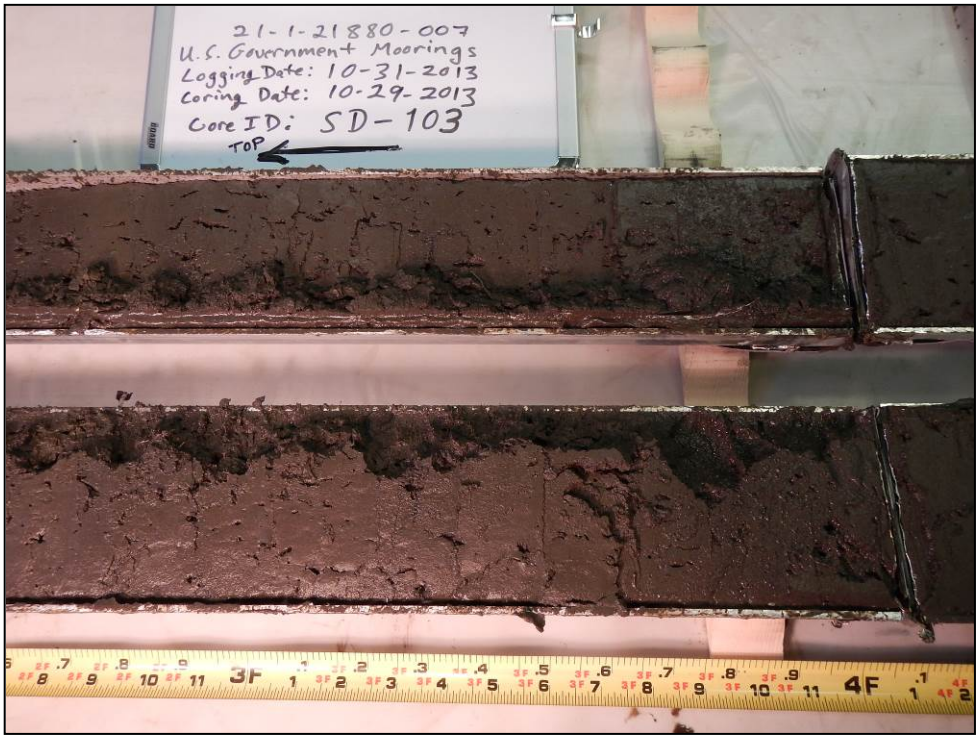
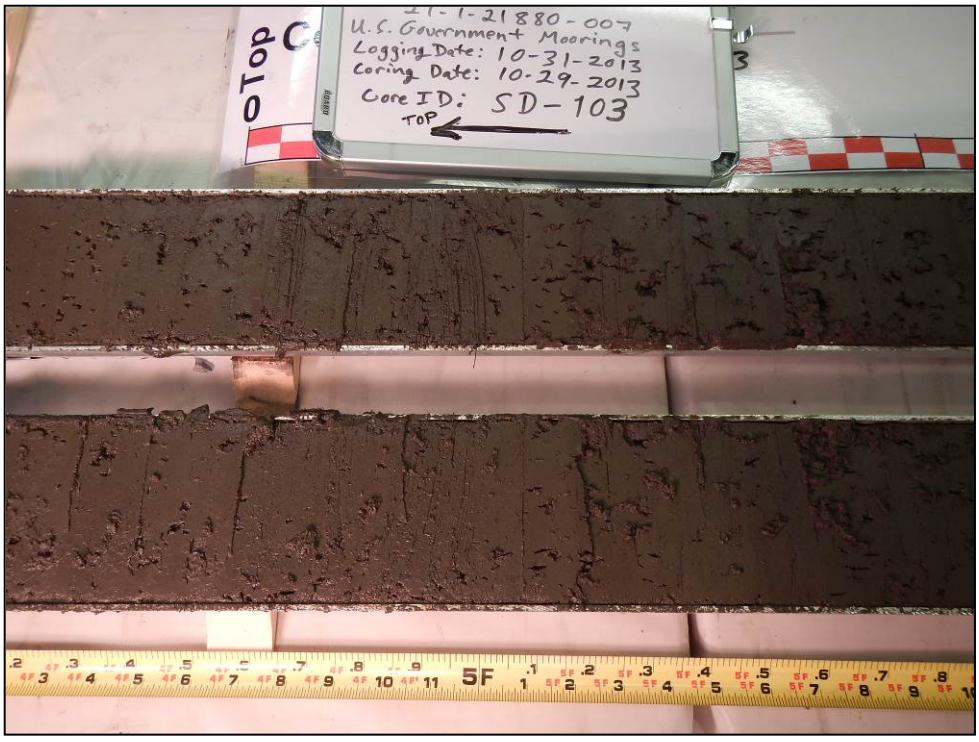


Core SD-103: 3 to 4 feet bml



Core SD-103: 5 feet bml

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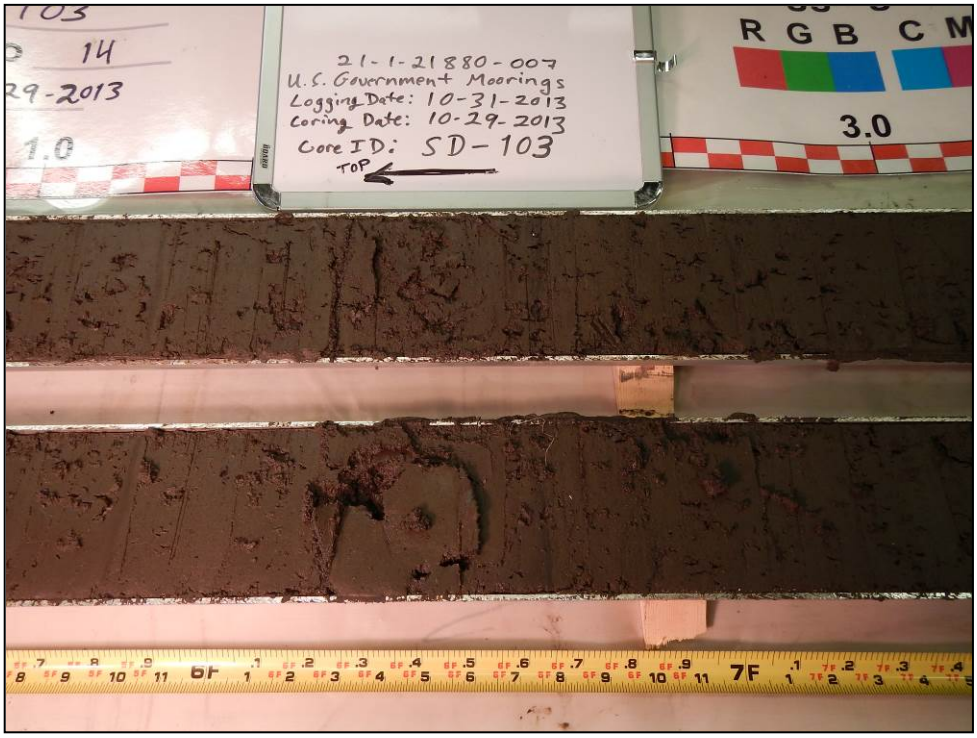

Core SD-103: 6 to 7 feet bml

Core SD-103: 7 to 8 feet bml

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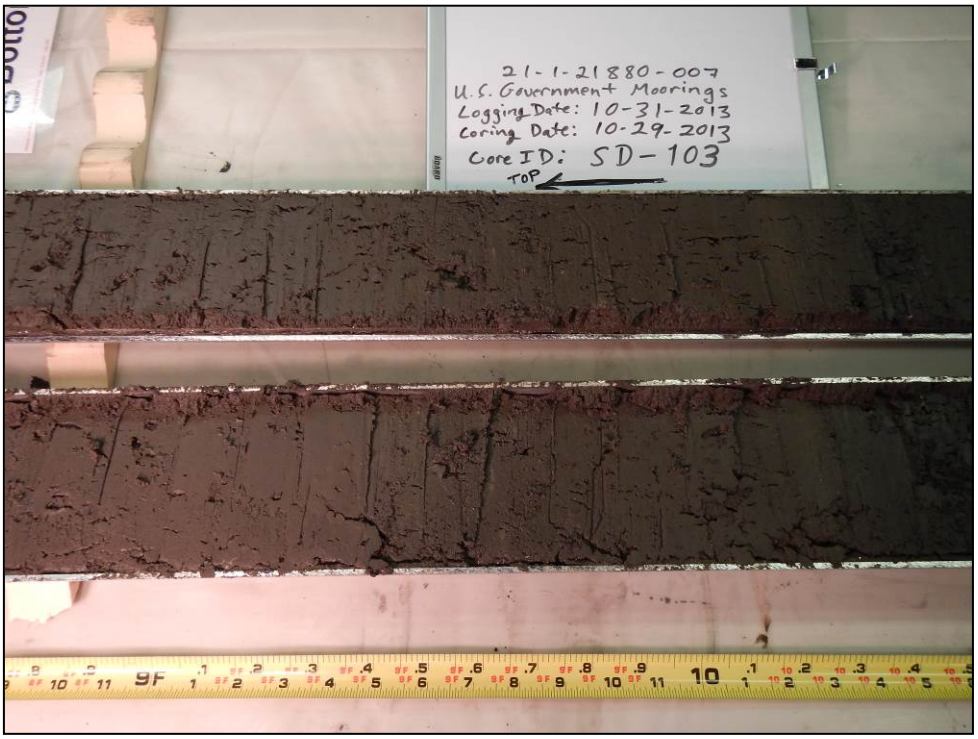
Core SD-103: 8 to 9 feet bml



Core SD-103: 9 to 10 feet bml

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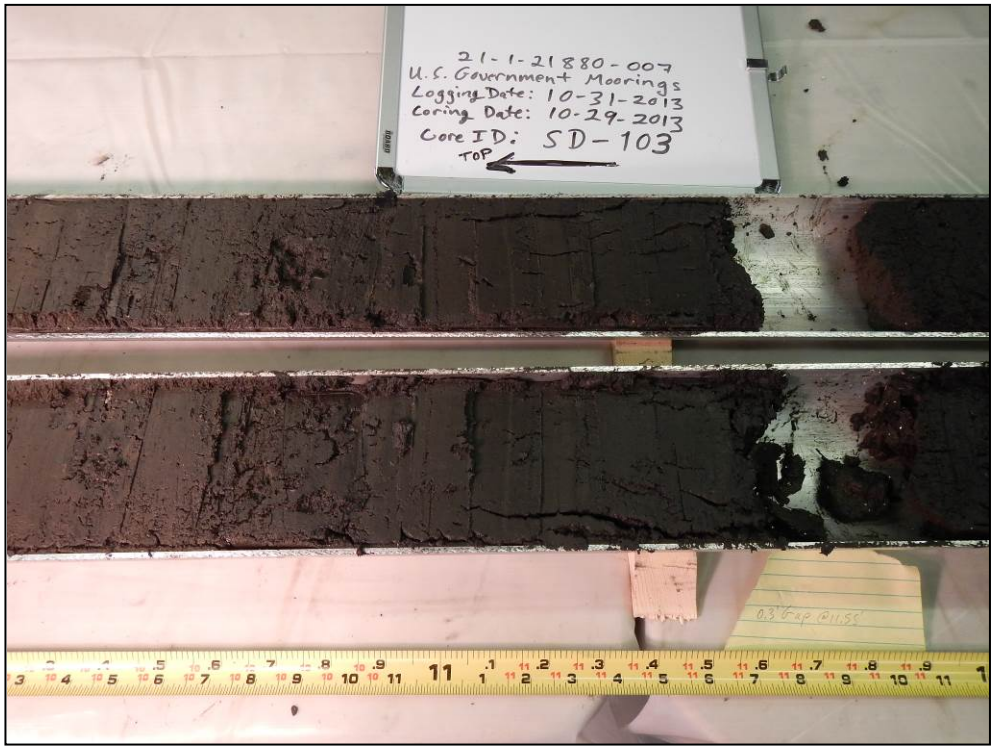

Core SD-103: 11 feet bml

Core SD-103: 12 to 13 feet bml

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Core SD-103: 13 to 13.9 feet bml

Core SD-109: 0 to 1 foot bml

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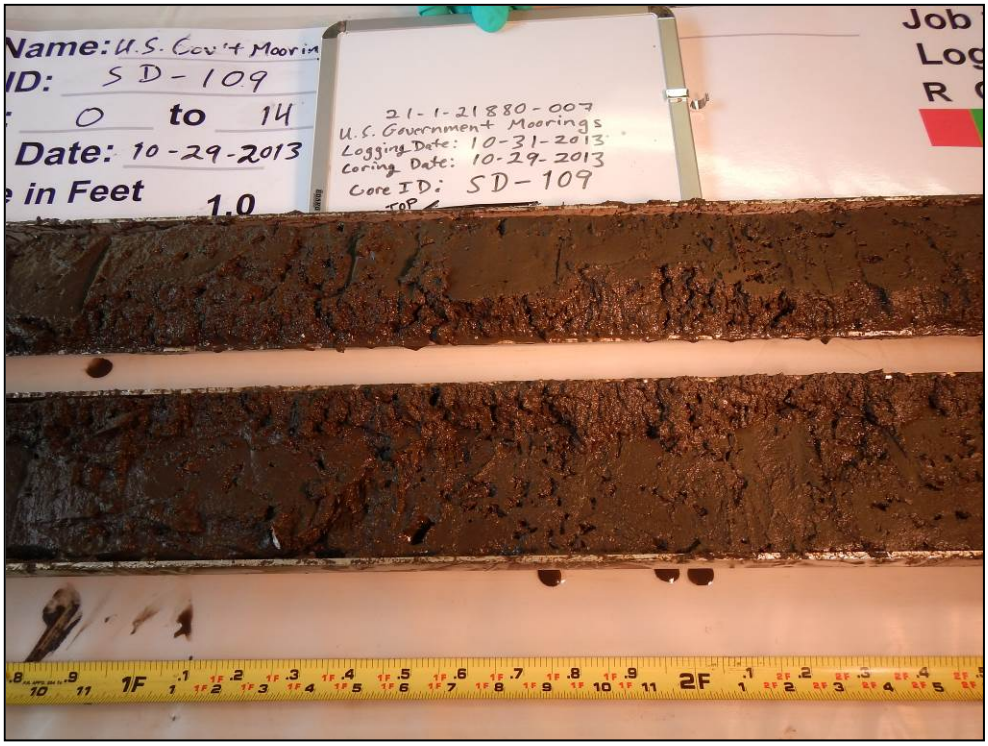
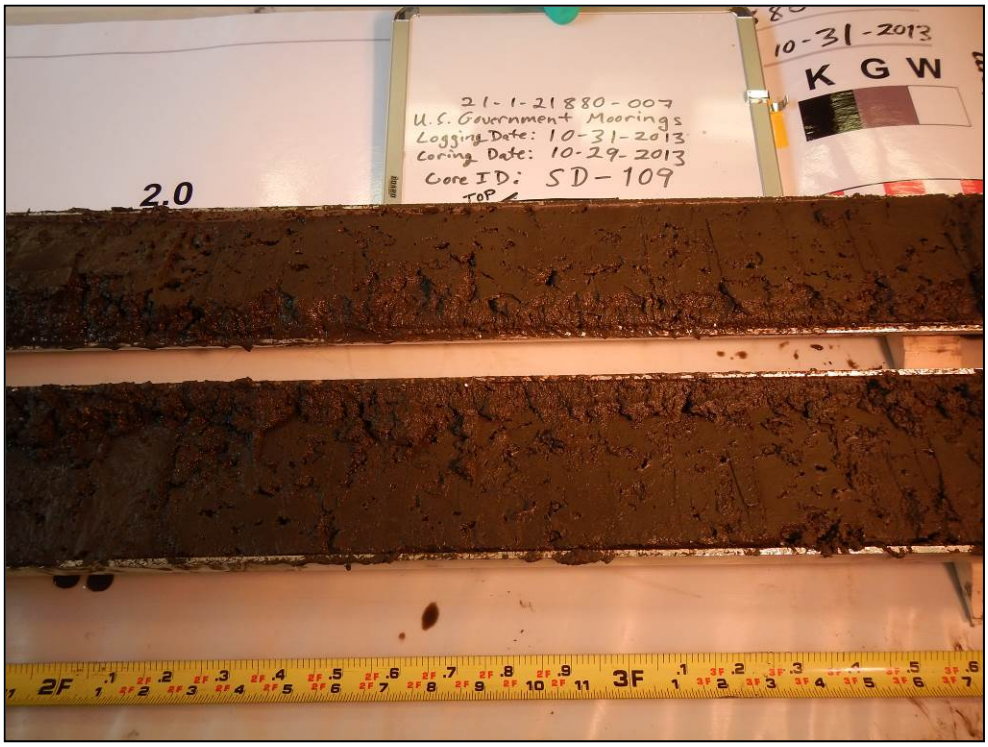


Core SD-109: 1 to 2 feet bml



Core SD-109: 2 to 3 feet bml

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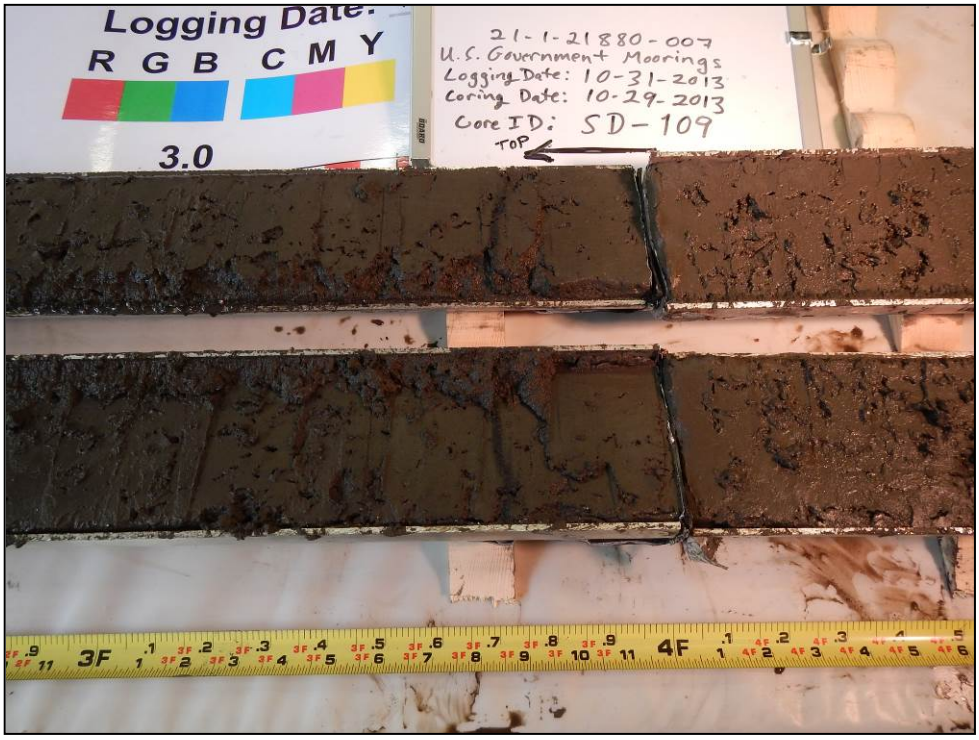

Core SD-109: 3 to 4 feet bml

Core SD-109: 4 to 5 feet bml

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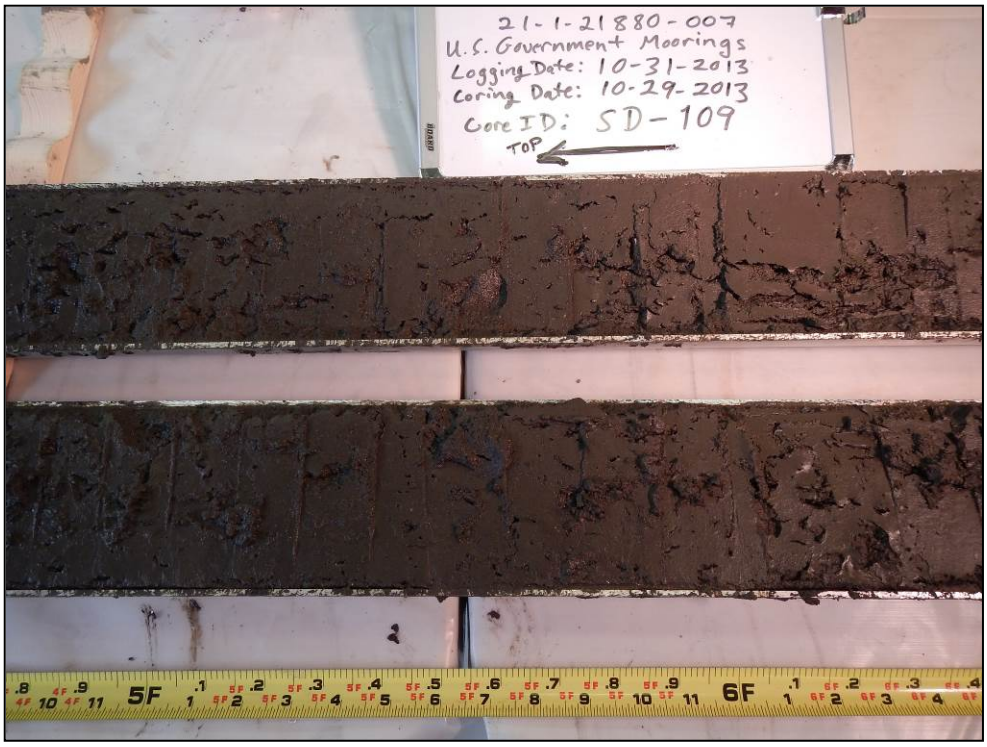
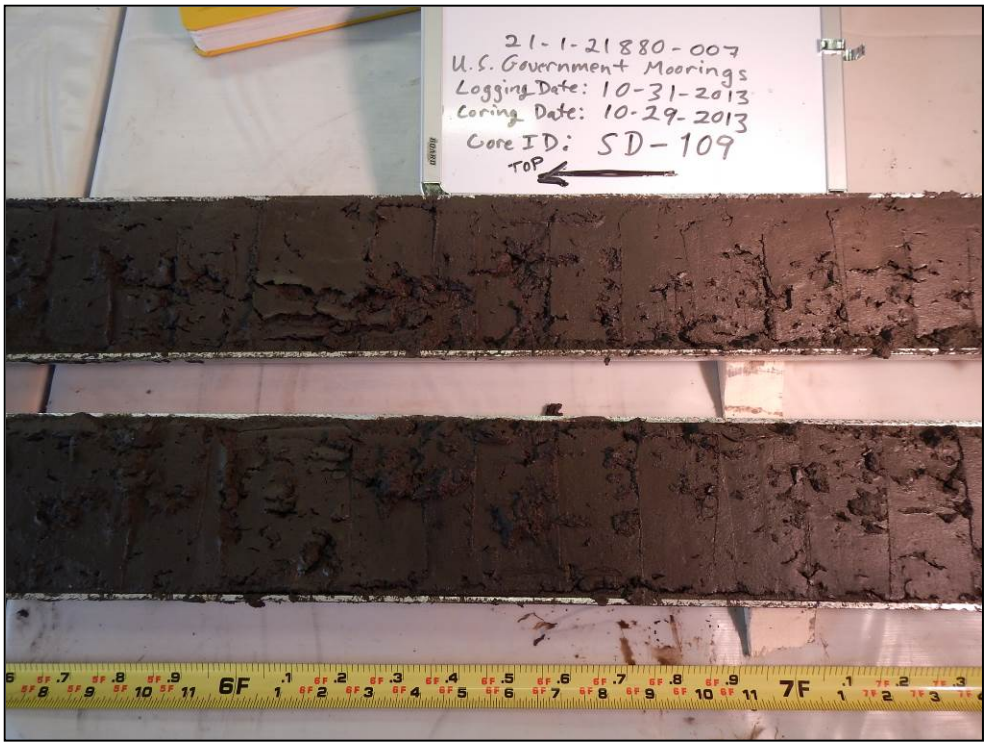


Core SD-109: 5 to 6 feet bml



Core SD-109: 6 to 7 foot bml

FIELD PHOTOGRAPHY LOG SHEET
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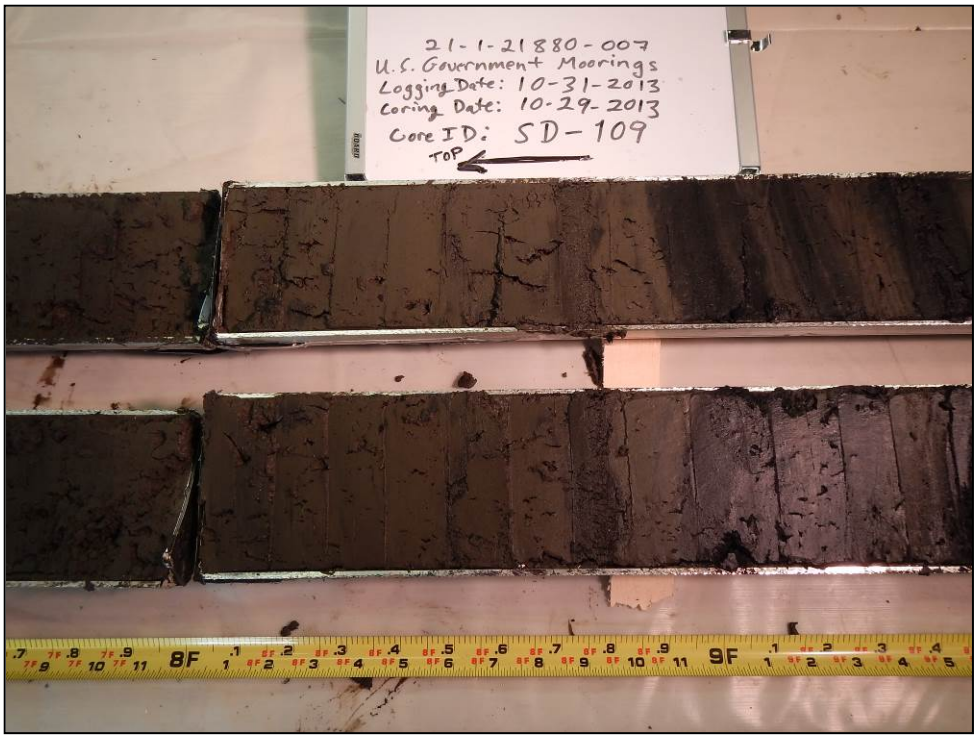
Core SD-109: 7 to 8 feet bml



Core SD-109: 8 to 9 feet bml

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Core SD-109: 9 to 10 feet bml

Core SD-109: 10 to 11 feet bml

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Core SD-109: 11 to 12 feet bml

Core SD-109: 12 to 13 feet bml

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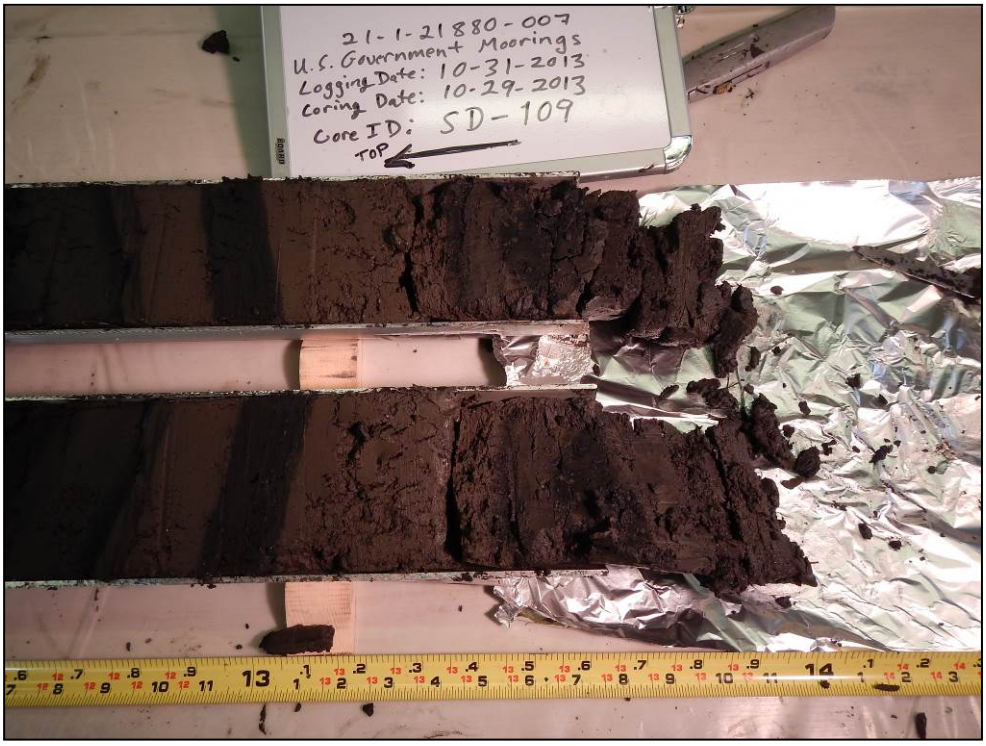
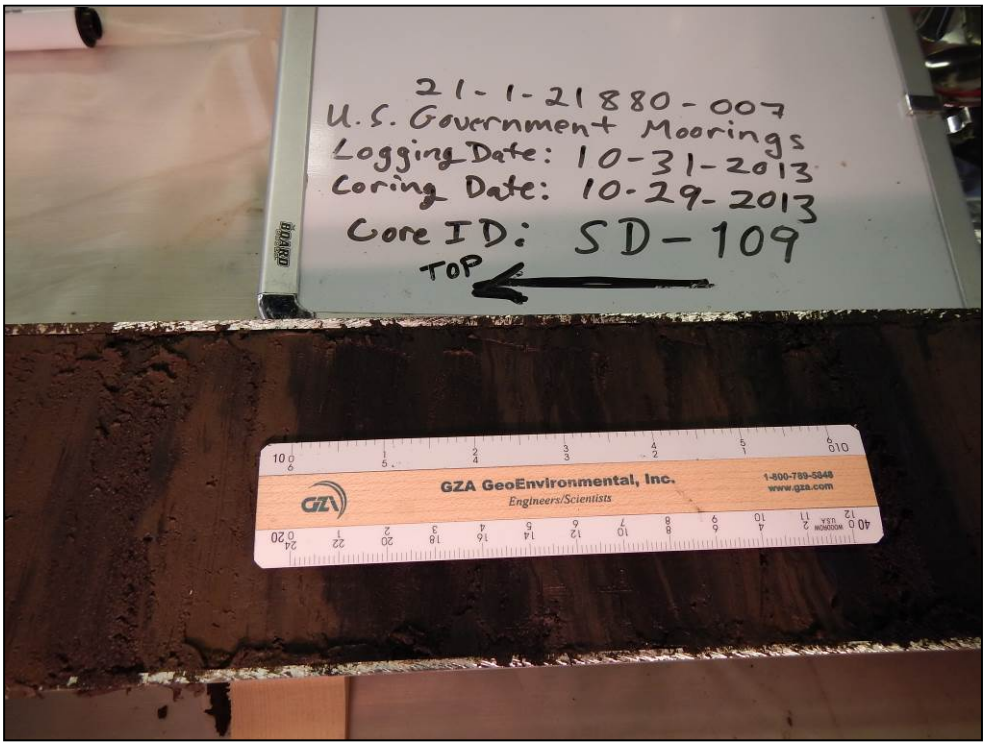


Core SD-109: 13 to 13.9 feet bml



Core SD-109: Black layer from 8.9 to 9.05 feet bml

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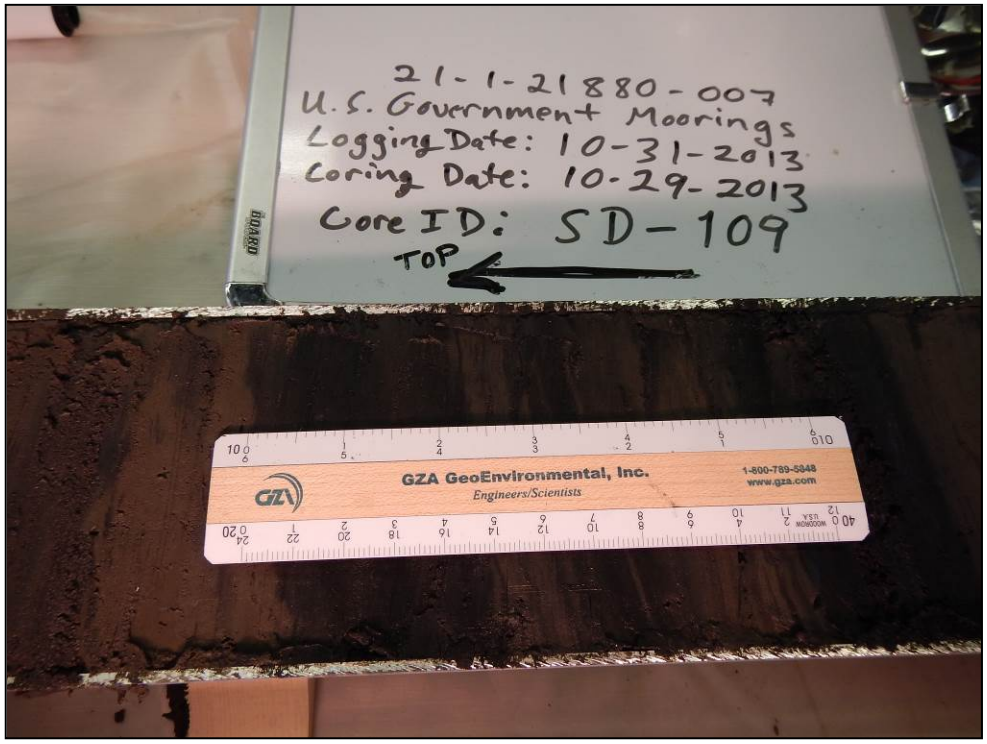

Core SD-109: Black layer from 8.9 to 9.05 feet bml

Core SD-107: 0 to 1 foot bml

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Core SD-107: 1 to 2 feet bml

Core SD-107: 2 to 3 feet bml

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Core SD-107: 3 to 4 feet bml

Core SD-107: 4 to 5 feet bml

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Core SD-107: 5 to 6 feet bml

Core SD-107: 6 to 7 feet bml

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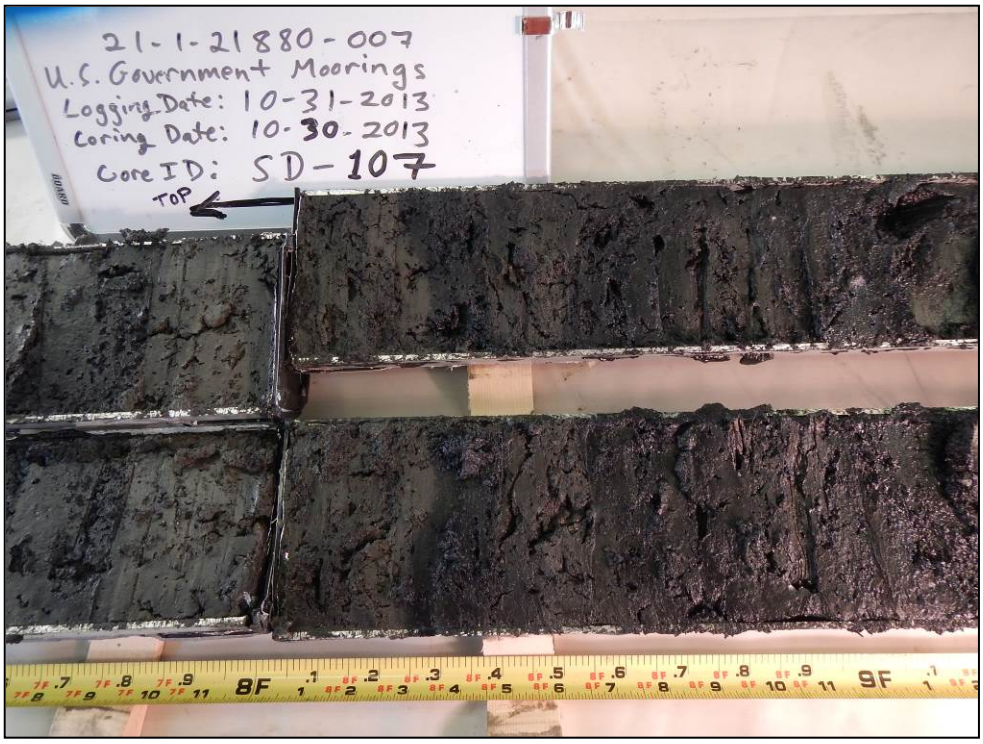
Core SD-107: 7 to 8 feet bml



Core SD-107: 8 to 9 feet bml

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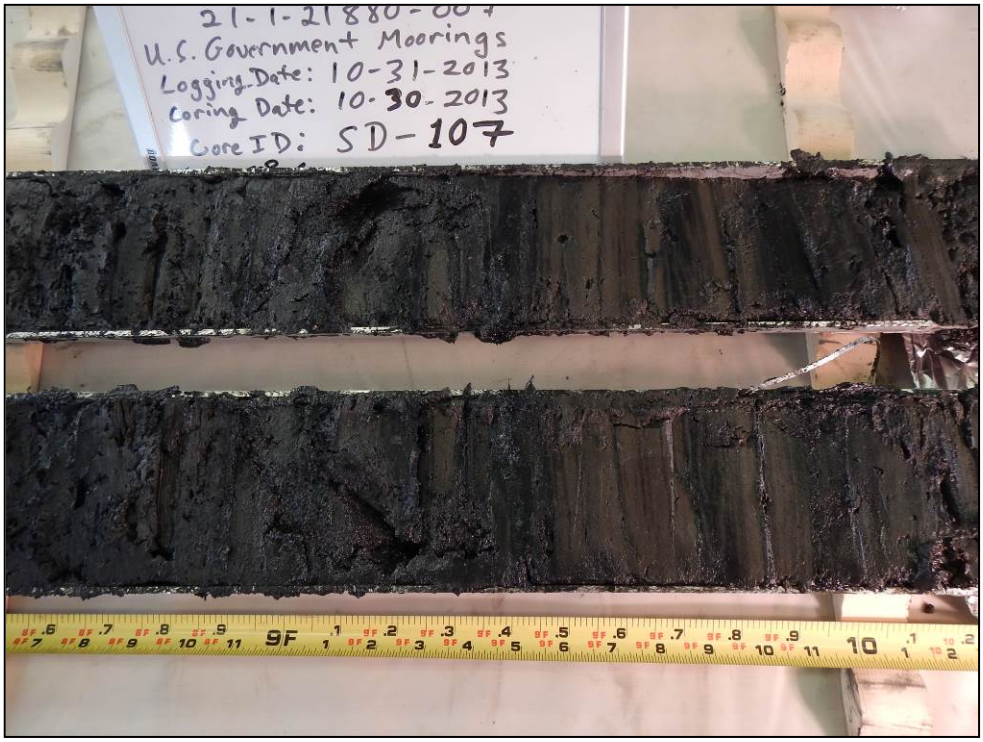

Core SD-107: 9 to 10 feet bml

Core SD-107: 10 to 10.5 feet bml

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Core SD-104: 0 to 1 foot bml

Core SD-104: 1 to 2 feet bml

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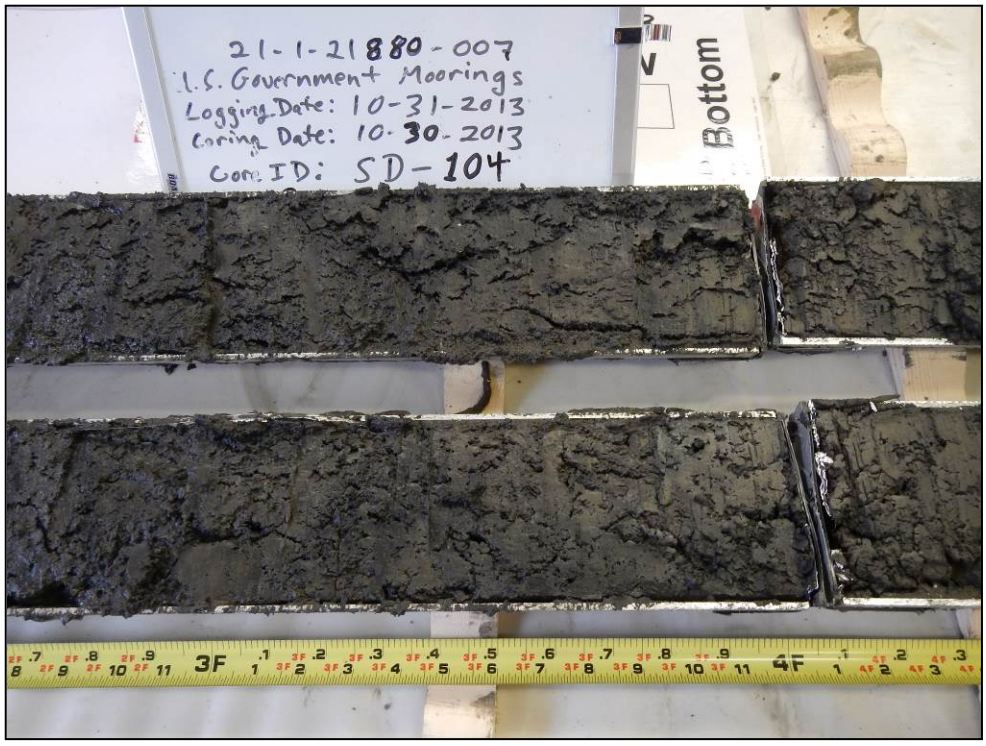
Core SD-104: 2 to 3 feet bml



Core SD-104: 3 to 4 feet bml

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Core SD-104: 4 to 5 feet bml

Core SD-104: 5 to 6 feet bml

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Core SD-104: 6 to 7 feet bml

Core SD-104: 7 to 8 feet bml

FIELD PHOTOGRAPHY LOG SHEET
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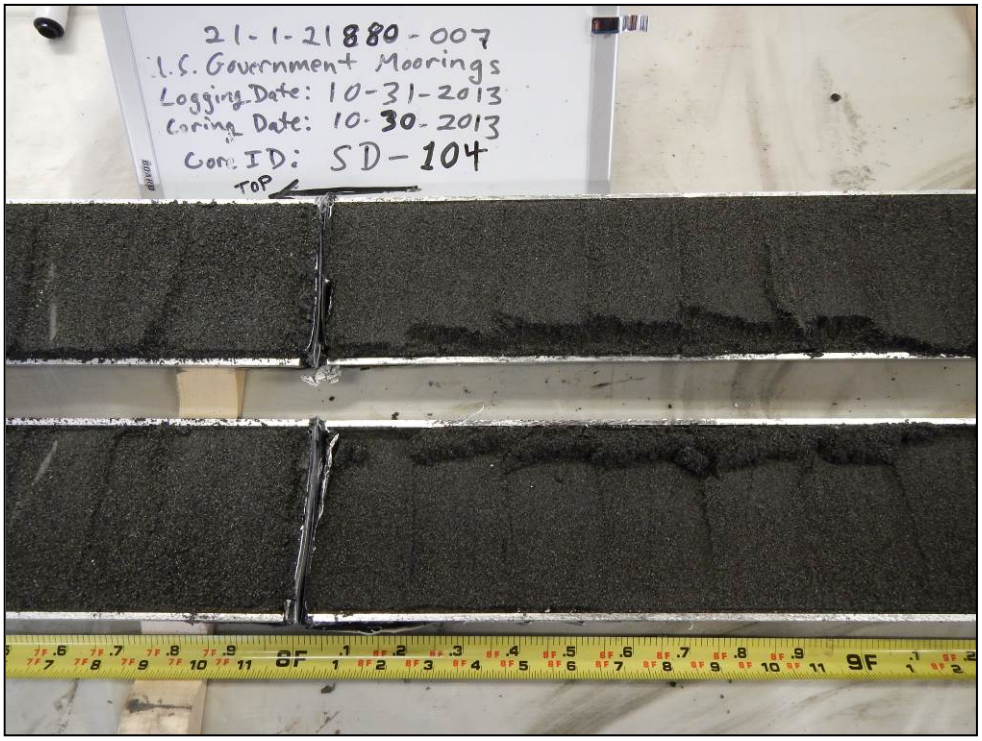
October 31, 2013



Core SD-104: 8 to 9 feet bml

Core SD-104: 9 to 10 feet bml

FIELD PHOTOGRAPHY LOG SHEET
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October 31, 2013

Core SD-104: 10 to 11 feet bml

Core SD-104: 11 to 12 feet bml

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Core SD-104: 12 to 12.15 feet bml

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November 1, 2013

Core SD-108: 0 to 1 foot bml

Core SD-108: 1 to 2 feet bml

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November 1, 2013

Core SD-108: 2 to 3 feet bml

Core SD-108: 3 to 4 feet bml

FIELD PHOTOGRAPHY LOG SHEET
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November 1, 2013

Core SD-108: 4 to 5 feet bml

Core SD-108: 5 to 6 feet bml

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November 1, 2013

Core SD-108: 6 to 7 feet bml

Core SD-108: 7 to 8 feet bml

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November 1, 2013

Core SD-108: 8 to 9 feet bml

Core SD-108: 9 to 10 feet bml

FIELD PHOTOGRAPHY LOG SHEET
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November 1, 2013

Core SD-108: 10 to 11 feet bml

Core SD-108: 11 to 12 feet bml

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November 1, 2013

Core SD-102: 12 to 13 feet bml

Core SD-108: 13 to 14.3 feet bml

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November 1, 2013

GS-01 Location

GS-01 Location – Sheen on water in excavation hole (2nd attempted core location)

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November 1, 2013

Core GS-01-AQ Core Location and Excavation (1st attempted core)

Core GS-01-AQ Core Location and Excavation (1st attempted core)

FIELD PHOTOGRAPHY LOG SHEET
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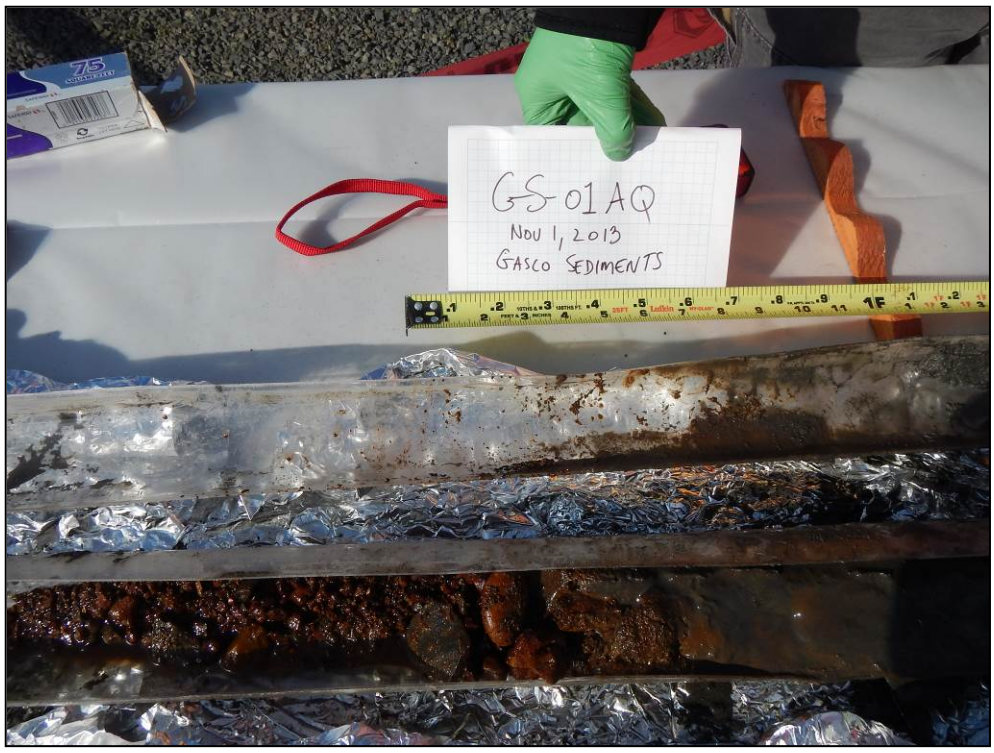
November 1, 2013

GS-01 Location – Sheen on water in excavation hole (1st attempted core location)



Core GS-01-AQ: 0 to 1 foot bml

FIELD PHOTOGRAPHY LOG SHEET
U.S. Moorings Substantial Product Investigation

November 1, 2013

Core GS-01-AQ: 1 to 1.6 feet bml

Core GS-01-AQ: Sediment removed during excavation to remove core from subsurface

Appendix C
Health and Safety Inspection Reports

CDM Smith Field Safety Report: Gasco/Moorings Offshore Sediment Sampling: 10/28/13

Health and Safety Summary

Recorded by: Shawn Oliveira, Certified Industrial Hygienist and Certified Safety Professional

10/28/13:

0800 hrs: CDM Smith and Anchor QEA personnel meet at the Gasco site for initial health and safety (H&S) kickoff meeting. Activities planned for October 28th included collection of 5 sediment cores adjacent to the U.S. Government Moorings (U.S. Moorings) property using a boat with Vibracore sampling technology and onshore core processing. Topics discussed include:

- Elements of Anchor QEA health and safety plan (HASP) (dated September 2010)
- Automated external defibrillator (AED) availability and operations
- Photoionization detector (PID) and Draeger tube monitoring of potential contaminants, including action levels and corresponding activities
- Routes of potential exposure, expected hazards, and control measures
- Personal protective equipment (PPE) required during offshore and onshore operations, including personal flotation devices (PFDs)
- Training certifications necessary for personnel
- Emergency response plans

0830 hrs: Arrive at Cathedral Park boat launch. Safety briefing held with Vibracore boat operators Marine Sampling Systems, Inc. (MSS) of Port Orchard, Washington (Bill Jaworski, vessel captain, and Dale Dickinson, deckhand). MSS personnel discuss vessel safety rules, emergency response, boat operations, and expected hazards/controls when on the vessel.

Following safety briefing, crew prepares equipment/vessel, launches, and proceeds to initial core sample location.

0923 hrs: CDM Smith H&S performs comprehensive safety inspection of ongoing project activities, and records no unsafe issues. Sampling and tasks are observed to be conducted in accordance with the Anchor QEA HASP and project safety procedures.

Approx. 1200 hrs: Crew returns to shore for lunch break and core processing following collection of two cores (SDDA-18-AQ and C528-AQ) using the Vibracore.

1300 hrs: Onshore core processing in progress. CDM Smith H&S performs comprehensive safety inspection of ongoing project activities, and records the following safety issues:

- Unable to determine whether the electric tools used in processing are running off of a ground fault circuit interrupter (GFCI) outlet. Markings were not present on the outlets and cords. Ryan Barth of Anchor QEA stated that GFCIs were inherent to the terminal wiring in use.
- A charged and inspected fire extinguisher was not in place initially during sample processing. Anchor QEA personnel immediately placed a suitable, charged extinguisher at the processing location.

- A gas can, and 3-20 liter cans of hexane were observed to be stored in a nearby Connex box (unrelated to oversight work). After bringing to the attention of Anchor QEA personnel, this was removed and placed in a separate flammable storage area.
- An aluminum core cutting tool (circular saw) appeared to have been locally modified. This was a tool constructed by MSS. The blade guard appeared to have been fixed in place, and unable to determine if this is consistent with the manufacturer's recommendations.

1419 hrs: Onshore core processing continues. CDM Smith H&S performs a comprehensive safety inspection of activities and records the following safety issue:

- Employee 40-hour HAZWOPER and 8-hour HAZWOPER Refresher certificates are not available onsite. It is noted that certain employees, such as the vessel deckhand, should require 40-hour training, but CDM Smith is unable to confirm this completion. Anchor QEA to provide these certificates and maintain onsite.

Overall Safety Summary

Based on a review of the Gasco/Moorings sample collection/processing performed by Anchor QEA and the vessel subcontractor, all program elements are in place to the degree required by the Occupational Safety and Health Administration (OSHA), applicable project HASPs, and accepted industry safety protocol as documented in the safety review inspections.

CDM Smith Field Safety Report: Gasco/Moorings Offshore Sediment Sampling: 10/28/13

The following are select photos from the 10/28/2013 Gasco/Moorings sampling activities.

Photo 1: Setup of core processing location on the Gasco site upland.

Photo 2: Offshore sample collection and data recording on Vibracore vessel.

Photo 3: Preparing Vibracore equipment for sampling activities.

Photo 4: Crew logs sample information. Volatile organic compound (VOC) monitor in foreground.

Photo 5 Anchor QEA personnel cutting sediment core tubes and processing core on the Gasco site upland.

CDM Smith Field Safety Report: Gasco/Moorings Offshore Sediment Sampling: 10/28/13

SafetyNet Inspection Review

The SafetyNet system employs a user-friendly platform to quickly and efficiently record observations of field activities. Checklists are accessed on a smartphone or tablet device and are used by H&S personnel to evaluate work progress and compliance with the September 2010 Revised Final Anchor QEA Health and Safety Plan. Observations of activities are objectively treated as either safe or unsafe. Safe observations are uploaded to the server and tracked accordingly. Unsafe observations are treated as an open issue that must be corrected. Information related to the unsafe observation, such as the type and severity of the hazard, recommended corrective action, party responsible for implementing the corrective action, and the timeframe required to complete the corrective action, must be entered. Unsafe observations (i.e., open issues) remain open until a corrective action has been confirmed. The time duration of open issues is also tracked.

The SafetyNet inspections allow for a comprehensive assessment of all program elements required under the HASP.

The following tables provide a summary of the SafetyNet inspections performed by CDM Smith H&S at the Gasco/Moorings sampling locations on 10/28/13.

CDM Smith Field Safety Report: Gasco/Moorings Offshore Sediment Sampling: 10/28/13

Inspection Type	Inspections	Observations	Unsafe Conditions	% Safe
Safety	3	168	5	97.00%

Gasco Moorings

Category	Sub-Category	Observations	Conditions		% Safe
			Unsafe Conditions	Safe Conditions	
Administration	Summary	25	0	25	100.00%
	Document pre-const mtgs	2	0	2	100.00%
	Emergency action plan	10	0	10	100.00%
	Freq/reg safety inspections	1	0	1	100.00%
	JHA/AHA submitted each trade	1	0	1	100.00%
	Safety manual	2	0	2	100.00%
	Safety meetings	3	0	3	100.00%
	State / Fed posters (Eng/Sp)	1	0	1	100.00%
	Visitor PPE available	2	0	2	100.00%
	Visitor sign-in form	3	0	3	100.00%
Drilling Operations	Summary	1	0	1	100.00%
	Containers labeled/stored	1	0	1	100.00%
Electrical	Summary	9	1	8	88.90%
	Cords in good condition	1	0	1	100.00%

CDM Smith Field Safety Report: Gasco/Moorings Offshore Sediment Sampling: 10/28/13

Category	Sub-Category	Observations	Conditions		% Safe
			Unsafe Conditions	Safe Conditions	
	Cords protected from traffic	1	0	1	100.00%
	Elect Hot Work Procedures	1	0	1	100.00%
	Electrical room protected	1	0	1	100.00%
	Energized parts protected	1	0	1	100.00%
	GFCI's used	2	1	1	50.00%
	Proper use temp pwr bxs	1	0	1	100.00%
	Signage present	1	0	1	100.00%
Environmental	Summary	18	0	18	100.00%
	Containers labeled	2	0	2	100.00%
	Dust Control Adequate	2	0	2	100.00%
	Haz material properly stored	2	0	2	100.00%
	Haz waste/RCRA requirements	10	0	10	100.00%
	Spill containment adequate	2	0	2	100.00%
Fire Protection	Summary	5	2	3	60.00%
	Ext charged and inspected	2	1	1	50.00%
	Fire suppression equip avail	1	0	1	100.00%

CDM Smith Field Safety Report: Gasco/Moorings Offshore Sediment Sampling: 10/28/13

Category	Sub-Category	Observations	Conditions		% Safe
			Unsafe Conditions	Safe Conditions	
	Proper fuel containers used	2	1	1	50.00%
Hand And Power Tools	Summary	16	1	15	93.80%
	Cord in good condition	2	0	2	100.00%
	Gauges working properly	4	0	4	100.00%
	Ground prong in place	1	0	1	100.00%
	Guards in place	2	0	2	100.00%
	Proper tool for the job	2	0	2	100.00%
	Strain relief functioning	1	0	1	100.00%
	Tool in good condition	4	1	3	75.00%
Hazard Communications	Summary	8	1	7	87.50%
	Copy of program	1	0	1	100.00%
	Employees trained	5	1	4	80.00%
	MSDS' (site specific)	1	0	1	100.00%
	Readily available	1	0	1	100.00%
Housekeeping	Summary	15	0	15	100.00%
	Clear access to bldg/site	2	0	2	100.00%
	Designated employee parking	2	0	2	100.00%
	Impalement protection	1	0	1	100.00%
	Proper material storage	2	0	2	100.00%
	Roadway around proj clear	2	0	2	100.00%
	Slip, trip, fall hazards	2	0	2	100.00%

CDM Smith Field Safety Report: Gasco/Moorings Offshore Sediment Sampling: 10/28/13

Category	Sub-Category	Observations	Conditions		% Safe
			Unsafe Conditions	Safe Conditions	
	Trash in protected cont	2	0	2	100.00%
	Walkways clear	2	0	2	100.00%
Medical / Emergency	Summary	16	0	16	100.00%
	1st Aid/CPR on site	2	0	2	100.00%
	1st aid kit	2	0	2	100.00%
	Emergency action plan	2	0	2	100.00%
	Emergency numbers posted	2	0	2	100.00%
	Emergency procs supplies	2	0	2	100.00%
	Eye wash	2	0	2	100.00%
	Map to medical facility	2	0	2	100.00%
	Team contact numbers	2	0	2	100.00%
P.P.E.	Summary	46	0	46	100.00%
	Glasses / face shields	7	0	7	100.00%
	Gloves	7	0	7	100.00%
	Hard Hats	7	0	7	100.00%
	Hearing protection	4	0	4	100.00%
	Metatarsal protection	7	0	7	100.00%
	Proper Clothing	7	0	7	100.00%
	Work Boots	7	0	7	100.00%
Site / Public Protection	Summary	9	0	9	100.00%
	Adequate break areas	4	0	4	100.00%
	Adequate lighting	1	0	1	100.00%
	Barricades installed properly	1	0	1	100.00%

CDM Smith Field Safety Report: Gasco/Moorings Offshore Sediment Sampling: 10/28/13

Category	Sub-Category	Observations	Conditions		% Safe
			Unsafe Conditions	Safe Conditions	
	Company rep present	1	0	1	100.00%
	Perimeter fences	1	0	1	100.00%
	Public protection signage	1	0	1	100.00%

OSHA Recordables/Lost Time:10/28/13 = 0	**OSHA Recordables/Lost Time To Date = 0**

Appendix D
Field Change Requests

NW Natural and Siltronic Corporation
Gasco Sediments Cleanup Action
Field Change Request Form

Project Name: Gasco Sediments Cleanup Action **Subconsultant:** Anchor QEA

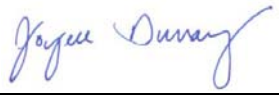
Field Activity: Sediment Core Collection **Request Number:** 1

To: Sean Sheldrake, EPA **Date:** October 31, 2013

Field Change Request (FCR) Title: Revised Core Collection Method - Insufficient Water Depth

Description: NW Natural attempted to collect a single core from each of the five target stations identified in the EPA-approved *Study Design for Sediment Characterization Adjacent to U.S. Moorings Site Required by EPA – Addendum 1 to the Project Area Identification Report Quality Assurance Plan*, dated July 18, 2013. The river water surface elevations were too shallow to facilitate core collection from a vessel at station GS-01.

Recommended Change: NW Natural proposes collection of the core at station GS-01 using a hand-driven core, accessed by personnel from the landside. The core will either be a 2-inch or 3-inch decontaminated, Polycarbonate tube that is 3 to 4 feet in length, respectively. The diameter size will be selected based on the nature of the encountered materials. Anchor QEA proposes collection at the target location on Friday November 1, 2013 between 12 and 1pm during the low tide. CDM Smith and USACE personnel will be present during collection. Anchor QEA and CDM Smith personnel will perform the core processing at an upland core processing area immediately following core collection to visually evaluate the presence of substantial product in the upper 0 to 2 foot interval. USACE personnel will be provided access to observe the core processing activities per EPA's request.

Joy Dunay		October 31, 2013
Respondent Field Coordinator (or Designee)	**Signature**	**Date**

Approval:

Ryan Barth		October 31, 2013
Respondent Project Lead	**Signature**	**Date**

Distribution List:

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Sheldrake.Sean@epamail.epa.gov; 206-553-1220

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NW Natural and Siltronic Corporation
Gasco Sediments Cleanup Action
Field Change Request Form

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NW Natural and Siltronic Corporation
Gasco Sediments Cleanup Action
Field Change Request Form

Project Name: Gasco Sediments Cleanup Action **Subconsultant:** Anchor QEA

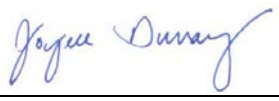
Field Activity: Sediment Core Collection **Request Number:** 2

To: Sean Sheldrake, EPA **Date:** November 5, 2013

Field Change Request (FCR) Title: Revised Core Collection Method Amended Approach

Description: As discussed in Field Change Request Form #1 dated October 31, 2013, NW Natural proposed the collection of a single hand-driven core at station GS-01 accessed from the landside. Anchor QEA, CDM Smith, and USACE personnel accessed the station from the landside on November 1, 2013. The subsurface substrate prevented the collection of a core to the target 3 feet below ground surface so Anchor QEA contacted EPA to propose a revised sampling approach. EPA agreed with the revised approach (described below) and provided verbal approval to proceed. The revised approach achieved the visual observations to the target depth.

Recommended Change: Station GS-01 contained 10-inch cobble at the ground surface so Anchor QEA field personnel removed the cobble to expose the underlying sandy surface. Anchor QEA attempted to hand drive a decontaminated 3-foot polycarbonate core tube to 3 feet below ground surface (2 feet 2 inches below sandy surface – accounts for removal of the overlying 10-inch layer of cobble). Several attempts were made to reach this target depth without success due to rocky substrate below the sand layer. The deepest core penetration was 3 feet 6 inches. Upon recovery of the core, only 1 foot 8 inches of material was recovered. Therefore, Anchor QEA contacted EPA to describe the recovery issue and propose a revised sampling approach that would allow visual observations of the remaining 6 inches below the core recovery depth. This approach included digging using a hand shovel and visually logging the mixed materials in coordination with CDM Smith. EPA approved this approach by telephone. Anchor QEA dug a hole to 3 feet below the cobble surface and placed materials in buckets. Anchor QEA and CDM Smith logged the materials captured in the core tube and visually logged the mixed material in the buckets. No material was identified that achieved the definition of substantial product so this station was designated as containing no substantial product.

Joy Dunay		November 5, 2013
Respondent Field Coordinator (or Designee)	**Signature**	**Date**

Approval:

Ryan Barth		November 5, 2013
Respondent Project Lead	**Signature**	**Date**

NW Natural and Siltronic Corporation
Gasco Sediments Cleanup Action
Field Change Request Form

Distribution List:

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